Insure VICTORY ... Buy Bonds for War ... Push Plans for Peace

Contractors and Engineers Monthly

Vol. 41, No. 12 DECEMBER, 1944 $2.00 a Year, 20 Cents a Copy

Be Sure to Read

A Wellpoint Job

"Water, water everywhere" may be a line of classic poetry, but it is frequently a contractor's nightmare. The contractor for an extension to the West Penn Power Co. plant, Springdale, Pa., solved the water problem in excavating for the deep heavy-concrete foundations by installing a complete wellpoint system which permitted work to proceed in the dry. See page 1.

Airport Construction

Boston, the hub of the universe, intends to maintain that place in the air-minded world of the future. One of the country's large post-war air terminals is now under construction in Boston harbor where hydraulic fill for the first two runways, 7,000 and 5,000 feet long respectively, has already been completed. A general description of this project is accompanied by an article on the dredges and the methods of placing the fill under the initial contract. Also in this issue is an account of the construction of a new concrete apron at an offshore Army base, the feature of which was the contractor's set-up for material delivery. See pages 2 and 60.

Year-Round Maintenance

Highway maintenance, like the brook, goes on forever, summer and winter. Among the many phases of highway maintenance covered in articles in this issue are Connecticut's method of preparing to handle the problems of winter maintenance, and Massachusetts' wartime maintenance program. See pages 12 and 25.

Contractors Go In for Mining

Up in New Hampshire, a number of road contractors are responding to the increased need for mica production, and at the same time are keeping their equipment and organizations busy, by opening and working mica mines. See page 23.

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Wartime Construction Of New Power Plant

DERRICK STONE FOR RIVER STABILIZERS

U. S. Engineers Photo

Twelve channel stabilizers of derrick stone with a concrete cover coat were completed recently in the Los Angeles River, California, by the Guy F. Atkinson Co. See page 33.

New 65,000 kw Extension Under Way Near Pittsburgh; Wellpoint System Is Used For Deep Foundations

By WILLIAM H. QUIRK,
Eastern Field Editor

(*Photos on page* 84)

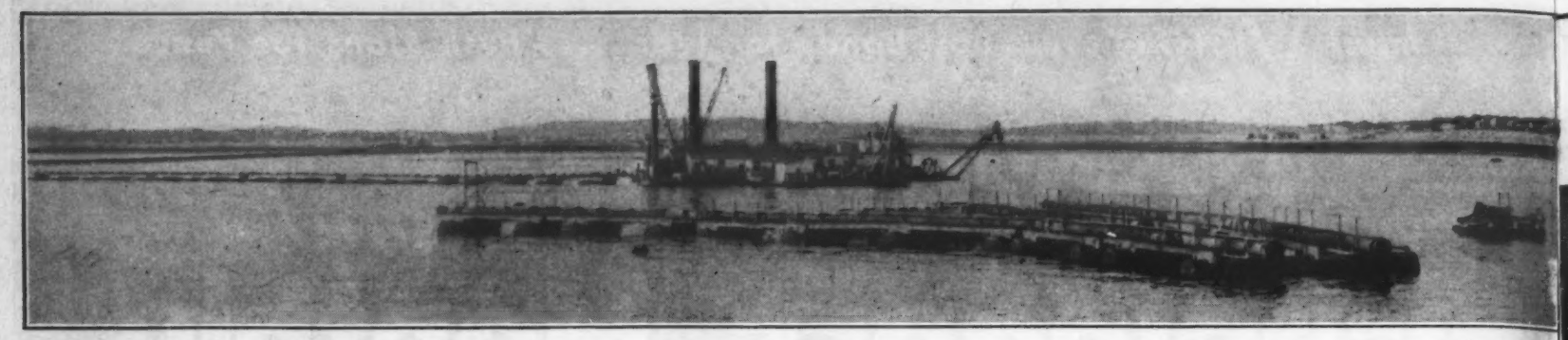
✦ THE West Penn Power Co., serving a large section of western Pennsylvania and with general offices in Pittsburgh, Pa., is enlarging its big generating station at Springdale on the Allegheny River, 20 miles northeast of Pittsburgh, by adding a new Westinghouse 65,000-kw turbine generator which will make this steam plant one of the largest in the country. Features of the work now nearing completion are the extensive use of wellpoints to permit deep excavation in the dry in an old filled swamp, and a cofferdam so that foundation excavation could be carried close to existing structures, while other sections were excavated allowing the ground to assume its natural slope. The total cost of this project will be over $6,000,000 and the new plant is expected to be operating near the end of 1945. An imperative need for added electric power in the important industrial area of western Pennsylvania resulted in the War Production Board sanctioning the building of this new unit.

Existing Plant

The present Springdale plant has a history of continued growth since work was first started in August, 1918, on the housing and installation of two 25,000-kw turbine generator sets. These units, together with the installation of six boilers, were completed in 1921. Two years later, in February, 1923, an addition was begun, consisting of eight more boilers and two 35,000-kw turbines, and was finished in 1924. But again the urgent demands for more light and power resulted in a 40,000-kw turbine generator being added. These five generators have a total rated capacity of 160,000 kw at 80 per cent power factor.

In May, 1936, six of the boilers were removed and three high-pressure boilers were installed. At this time there was also installed a 50,000-kw high-pressure topping unit which was superimposed on the other five sets by using steam at 1,250 pounds per square inch and exhausting it into a common station header at 325-pounds-per-square-inch pressure, No interruption to plant operation was caused by this construction and the unit

(*Continued on page* 14)



Big Airport in Boston Harbor

Work Completed on Foundations for Two Runways

Material from Harbor Used To Enlarge Original Field Between East Boston and Winthrop Shores

✦ AS part of the program to enlarge the Boston Airport into one of the super-airports in the country, 5,500,000 cubic yards of hydraulic fill have been placed for the immediate construction of two new runways, 7,000 and 5,000 feet long respectively. These improvements, together with such natural advantages as a 10-minute running time by car from the heart of downtown Boston, its location upon the sea, at the terminus of the shortest line of flight to England, will put Boston in a strong position for aerial commerce along the eastern seaboard. The contract for this first step in the master plan to increase the area of 275 acres to an eventual 2,000 acres was awarded by the Commonwealth of Massachusetts to the Gahagan Construction Corp., New York City, for $1,250,000.

State Project, 1898-1928

The East Boston airport is not a new venture but is already over twenty years old. The Commonwealth of Massachusetts was acquiring land, including large areas of tidal flats, at East Boston as early as 1898, in order to secure public ownership and control of this portion of the waterfront for the development of piers and docks with rail connections and land for industrial and manufacturing purposes. The Atlantic, Gulf & Pacific Dredging Co. began placing fill there in 1915. By 1922, the increase in public interest in aviation caused a considerable demand for landing fields, so this acquired area provided a convenient and suitable site for the purpose. Contracts were let for grading, filling and surfacing with cinders. The original layout for the landing field was in the form of a "T", each leg of which was 1,500 feet long and 200 feet wide, with a crown in the center of the runway. In cross section the slope of the 1-foot-thick cindered surface was about 1 in 50. The field was officially opened to air traffic in 1923.

By 1927, the reclaimed area amounted to 150 acres, with 26 of these covered with cinders. Hangars had been erected by both state and Federal governments. Total costs, including land takings, dredging, filling, bulkheading and general improvements, amounted to $3,000,000. In 1928, in keeping with the state policy of the time, that airports should be municipally or privately established and operated without the aid of state funds, the airport was leased to the City of Boston for twenty years.

Improved by City, 1928-1941

The City of Boston, under the term of its occupancy, carried out considerable development of the airplane landing field by building bulkheads, filling, grading, excavating and surfacing, constructing the administration building and other structures, including runways, an 8-inch-thick concrete apron in front of the hangars, eight concrete take-off strips, fences, sewers, drains, a seaplane ramp, floodlights, boundary lights, electrical systems, roadways, walks and parking areas, at a cost estimated at more than $1,000,000.

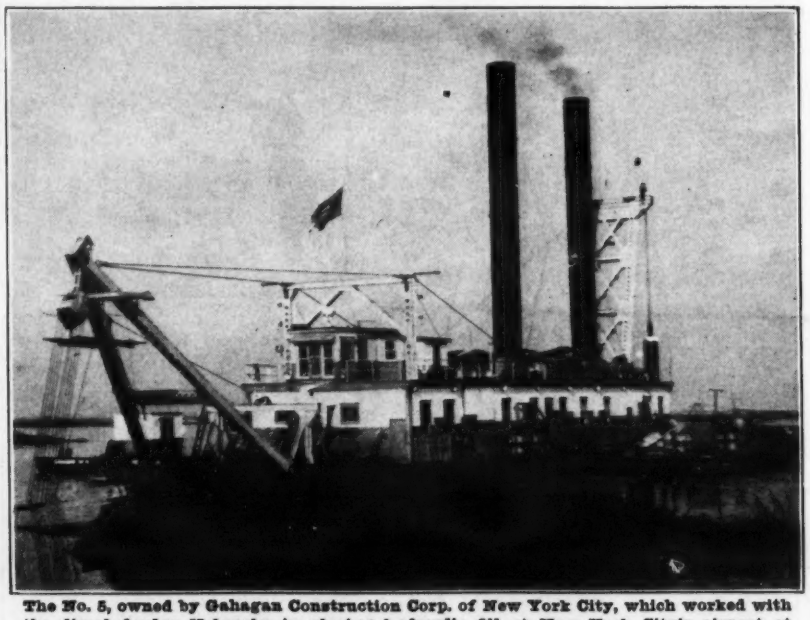
In 1941, however, the Legislature

(*Continued on page* 18)

Gahagan Construction Corp. Had Two Hydraulic Dredges Placing 5,500,000 Yards of Fill for Runways

✦ IN enlarging the present East Boston Airport by adding two needed runways, the Commonwealth of Massachusetts contracted with the Gahagan Construction Corp. of New York City to pump 5,500,000 cubic yards of hydraulic fill from the bottom of Boston harbor to act as a foundation for the new runways. Two dredges, the Nebraska and No. 5, worked day and night on this $1,250,000 job, which not only provided suitable material for the airport fill, but also improved the harbor by enlarging the deep water area. The present main ship channel from ocean to docks is 40 feet in depth. When dredging is completed, this depth will prevail northward from the ship channel to the southerly boundary of the airport itself. Dredged material is mainly Boston blue clay which compacts into a solid mass forming a firm foundation for the two runways, 5,000 and 7,000 feet long x 500 feet wide.

Dredging began in February, 1944, and satisfactory progress was maintained with an average of 25,000 cubic yards placed a day for the two dredges. The work was completed last month. A contract for two other runway foundations, amounting to 10,000,000 cubic yards, was awarded recently to Gahagan for $2,170,000. This article, however, describes the initial contract.



The No. 5, owned by Gahagan Construction Corp. of New York City, which worked with the diesel dredge Nebraska in placing hydraulic fill at New York City's airport at Idlewild, L. I., and Boston's new airport in Boston harbor.

Two Dredges Operating

The big dredges doing this large job of earth moving make an interesting study. The more modern Nebraska has been adequately described before (See C. & E. M., October, 1943, page 9) but No. 5, a steam-driven dredge, has also been doing yeoman's service in Boston harbor and is worth a look aboard. No. 5 is a sturdy craft whose wooden hull measures 158 feet 6 inches long, 44 feet 2 inches on the beam, and 12 feet deep. The overall length, including ladder, is 211 feet. Steam, the driving power, is generated in four Heine water-tube boilers carrying 250-pounds steam pressure which drives a 3,500-hp Elliott steam turbine at 325 rpm for the main pump. This dredging pump, designed and built by the contractor, has a 31-inch suction with an 84-inch propeller, operating at 325 rpm. Another Elliott steam turbine drives the main generator, developing 500-kw dc, 1,800 amp, 250 volts at 900 rpm, which furnishes current for two motors. The first of these, driving the 6½-foot-long cutter head, is a Westinghouse 400-hp dc motor, while the second is an Elliott 100-hp unit that drives the swing engine, a Bucyrus-Erie electric winch.

On the bow is a 73-foot ladder carrying the 6-blade toothed cutter head which loosened the material on the harbor floor. It can work to a maximum depth of 52 feet on a 45-degree angle. In the suction line just ahead of the pump is a manhole which is opened to remove any large rocks which might damage the pump impeller. From the cutter to the swivel joint, just aft of the cutter motor, the 31-inch suction line is made of ¾-inch rolled steel. Back of the pump, running through the center of the dredge to the discharge at the stern, the 30-inch pipe is cast steel with a 2-inch wall, a

(*Continued on page* 56)

Floating and land lines delivering dredged fill for the north-south 7,000-foot runway at the new General Edward Lawrence Logan Airport at East Boston, Mass.

Where new war planes try their wings

United Aircraft Corp. Photograph

RENTSCHLER FIELD
operated by Pratt and Whitney Aircraft, E. Hartford, Conn.

Applying Texaco Asphalt in the construction of a 3-inch Asphalt Penetration Macadam base for the runways. The application contractor was Ford Brothers, Inc.

Rentschler Field is operated by the Pratt and Whitney Aircraft Division of United Aircraft Corporation in East Hartford, Conn. Begun in 1931, this airport has been expanded three times since, as Pratt and Whitney stepped up its contribution to Uncle Sam's fast-growing air power. Newly completed Army and Navy planes, as well as experimental models, are put through their paces at this field.

Texaco Asphalt contributes in an important way to the durability of Rentschler Field's three 5,000-foot runways. Approximately half-a-million gallons of Texaco have been applied by pressure distributor in the construction of the runways' 3-inch Asphalt Penetration Macadam foundation. From the subgrade up, these runways consist of two inches of stone dust, four inches of broken stone filled with stone dust, the three-inch Texaco Asphalt Macadam foundation and a two-inch plant-mixed asphalt wearing surface.

Heading the list of Texaco Asphalt's multiple services to the war effort are the millions of square yards of Army and Navy airport runways paved with Texaco since Pearl Harbor.

Texaco Engineers, specialists in Asphalt construction, are at the service of anyone having a street, highway or airport paving problem. Write our nearest office.

THE TEXAS COMPANY, *Asphalt Sales Dept.*, 135 East 42nd St., New York City (17)

Boston (16) Chicago (4) Denver (1) Houston (1) Jacksonville (2) Philadelphia (2) Richmond (19)

TEXACO ASPHALT

Contractors and Engineers Monthly

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Synthetic-Rubber Investment Need Not Be Lost to the U. S.

The synthetic-rubber program which was born of the war at a cost of over $750,000,000 has kept our armed forces and civilian transportation rolling. In spite of the too rosy outlook which promised "new tires on every vehicle", immediately followed by acrimonious epithets hurled by one bureaucrat at another, we have been able to furnish transportation for our fighting men on rubber "Made in U. S. A.".

This has been an expensive program, but what part of a war program is not? Now, is there an opportunity to convert this war expense into a peacetime asset? There are hundreds of commercial uses of synthetic rubber that cannot be served by, or as well by, natural rubber. Further, the lessons learned in the wartime production of synthetic rubber have already lowered its production costs to a figure which makes its wide-spread use practicable, although wartime prices can not necessarily be taken as a basis for future prices. Nevertheless, reputable chemical engineers state that it can be produced at a reasonable price, as the result of continued research.

Our readers are chiefly interested in the use of rubber, synthetic and natural, for highway equipment, both on and off the road, for their automobiles and for trucks. Thus far, and only up to the moment of writing, synthetic rubber has not reached the complete serviceability of natural rubber for pneumatic tires under wide temperature variations, extreme speed ranges, and in exceedingly rough terrain "off the road". Therefore, the construction industry continues to look hopefully toward the natural-rubber plantations, still in enemy hands.

With the constant development of qualities in synthetic rubber approaching those of the natural product, our new war-born "Made in U. S. A." rubber industry has a constant police power over the price of natural rubber when it again comes on the market. James J. Newman, Vice President of The B. F. Goodrich Co., has pointed out that, if a continuation of the synthetic-rubber program kept the price of raw rubber 10 cents a pound lower than it would be without the influence of synthetic, this country would save $190,000,000 a year over the pre-war cost of natural rubber, on an annual consumption of 850,000 tons. In four years this saving would compensate fully for the wartime outlay for our synthetic rubber plants, with continuing savings thereafter.

The welfare of many people in the world depends on a thriving natural-rubber business, and it is to the advantage of all nations that the production of natural rubber be resumed as soon as possible after victory. However, in making trade treaties and international economic arrangements, this country should not agree to scrap its synthetic-rubber plants and thus leave the way open for exploitation of the world's need for rubber by the natural-rubber industry. Rather, we should aim to maintain our synthetic-rubber industry, which will provide that healthy competition essential to keep natural-rubber prices within bounds, and at the same time so expand the uses of rubber that international natural-rubber markets will not be impaired by a continuation of synthetic-rubber production.

In this way, reduced production costs, expanding markets, and competition will serve to lower the cost of highway transportation as well as of off-the-road equipment throughout the world.

The Score

New Bridge Div. Chief Is Appointed by PRA

The Public Roads Administration has announced the retirement of Oscar L. Grover, Chief of the Bridge Division, due to his having reached the retirement age. He has been reappointed as special consultant on bridge and structural problems and will continue to serve the organization in planning post-war construction. Mr. Grover's services with the Federal government began in 1914, and he has been in charge of bridge design throughout the entire period of Federal-Aid road construction.

Raymond Archibald, Principal Structural Engineer, has been appointed Chief of the Bridge Division. He has been with the Public Roads Administration since 1935 and was in charge of the design and construction of bridges on the Alaska Highway, which involved 133 stream crossings, including a number of large rivers, and presented many problems not encountered on normal bridge work. Mr. Archibald is a native of Albany, Ore., and was graduated in civil engineering at Oregon State College in 1919. Before joining the Public Roads Administration, he was engaged on bridge work for a number of state highway departments.

Pavement Replacement On Missouri-U.S. 40

The Missouri State Highway Department is making repairs to its concrete pavements in practically all of its ten Divisions. For several years Mud-Jacking has been used to check "pumping" of concrete slabs under heavy traffic where the pavement has not disintegrated (C. & E. M., January, 1943, pg. 22).

In some cases, however, pavement replacement is necessary. The pictures on this page show step-by-step the method of repair or patching used in central Missouri on U. S. 40 east and west of Kingdom City in Callaway County. This work is typical of the methods being used throughout the state and was done under the supervision of the Division 5 Office at Jefferson City by a maintenance crew with Herb Tanner, Concrete Replacement Foreman, in charge.

Missouri Maintenance

1. The first operation in patching concrete roads is breaking out and removing the shattered concrete slab. 2. The old subgrade is then hand-leveled and graded by part-time employees. 3. A weight proportioning plant is set up and wet-batch concrete trucked to the job. 4. The ready-mixed concrete is dumped and struck-off by hand, after vibration. 5. The slab is edged and Plasticote curing compound applied as for new pavement. 6. The finished job is checked, hand-floated where necessary, and given the final finish.

Photos by Walter Pohl, Missouri State Highway Dept.

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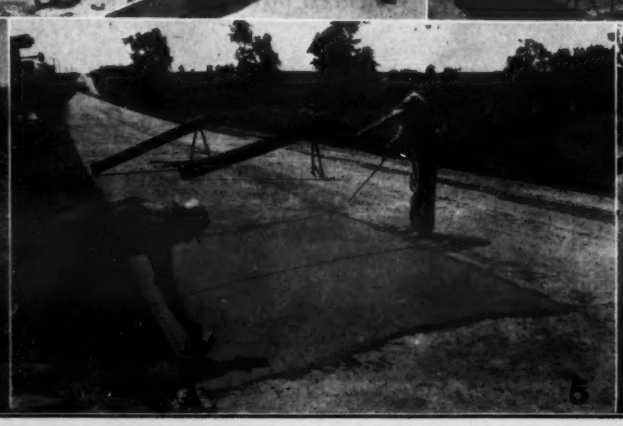
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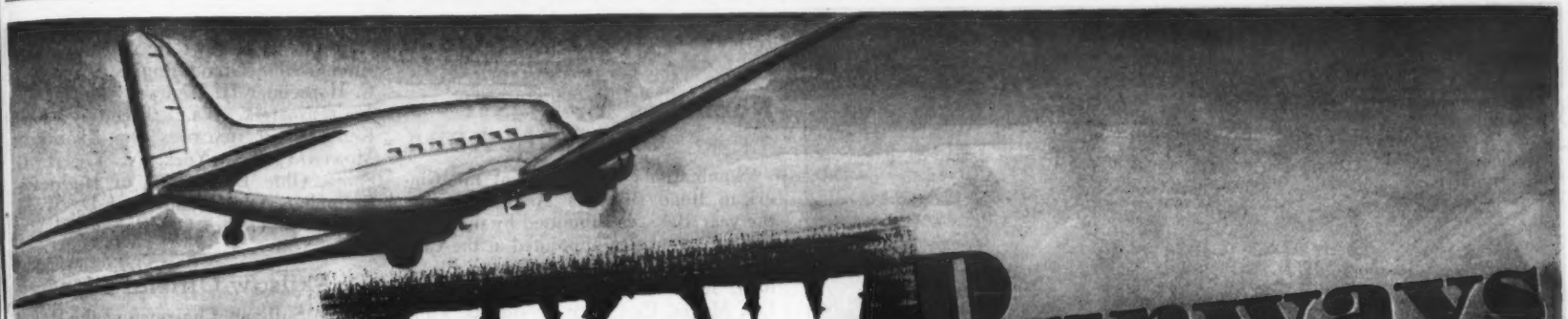
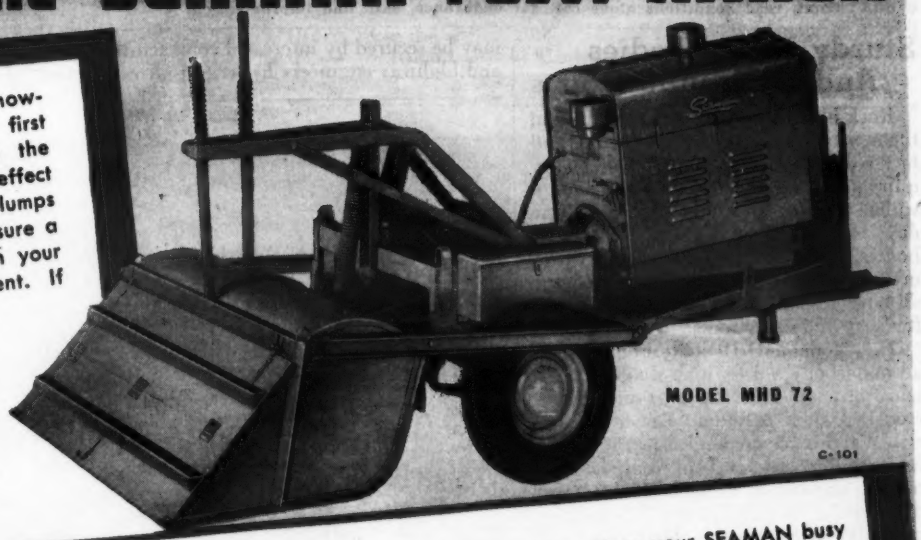


Safe SNOW Runways

WITH THE SEAMAN PULVI MIXER

Developed In Alaska: Using the SEAMAN PULVI-MIXER to pulverize and level snow to aid in compaction for high load bearing, low cost snow runways.

Turn the first heavy snowfall to your airfield's advantage! And with every successive snow,—cross out the word "removal" from your maintenance dictionary and substitute "utilization" instead. For, with the SEAMAN PULVI-MIXER, snow is utilized, to make firm, hard, smooth and level runways,—without creating dangerous, adjacent snowbanks. Pulverize the snow first with the SEAMAN. Keep the hood closed, of course, to effect complete pulverization of lumps and hard spots and to assure a level path. Then bring on your roller compaction equipment. If after sufficient rolling, a few high spots remain,—grind 'em down with the SEAMAN,—this time with the hood open to disperse loose material over a wide area.



MODEL MHD 72

C-101

SEAMAN PULVI MIXER

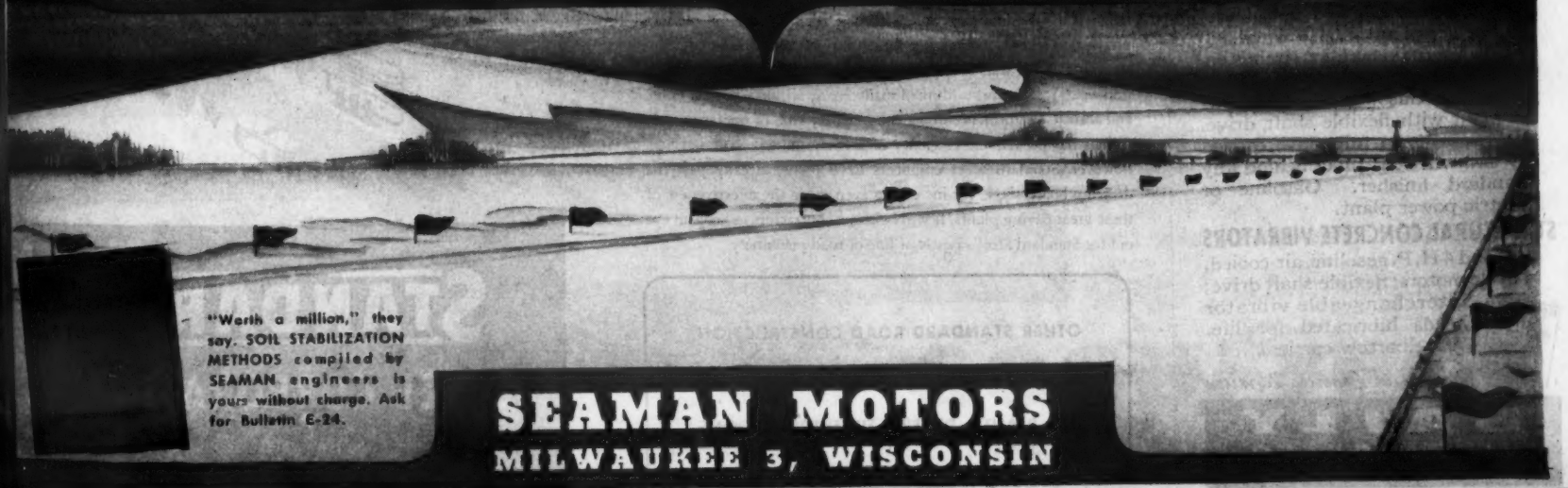
Every Road Mix Job Needs A Seaman

And remember, the SEAMAN is unique in removing ice and hard-packed drifts from runways and highways. Because a compensating device permits the new "shock-cushioned" tines to stop momentarily when impact approaches a damaging force, ice is shattered without damage to pavement or tines.

A tip to contractors: Keep your SEAMAN busy through otherwise idle winter months. Contract to keep nearby airfields in shape. Let the airfield management make the choice: snowplows plus the SEAMAN for keeping runways free of ice and hard, frozen drifts,—or snow compacted runways with the SEAMAN in the stellar role.

The SEAMAN MIXER loosening and pulverizing snow prior to compaction

Removing ice from airport runways with the SEAMAN MIXER



"Worth a million," they say. SOIL STABILIZATION METHODS compiled by SEAMAN engineers is yours without charge. Ask for Bulletin E-24.

SEAMAN MOTORS

MILWAUKEE 3, WISCONSIN

British Combine Photo
On the Kohima-Imphal road in India, heavy rains frequently result in heavy landslides, holding up important military convoys. Then sappers and miners rush to the rescue to clear away the earth and rock and make the road passable. On the Burma front, road conditions alone call for endurance, skill and improvisation.

Sturdy Dump Bodies And Hydraulic Hoists

Rock bodies built of steel to withstand the most severe usage under shovels, and heavy-duty hydraulic hoists will be requirements of the heavy construction which we face ahead in early post-war days. The line of Marion hoists and bodies, made by the Marion Metal Products Co., Marion, Ohio, is designed for all types of hauling jobs and particularly for heavy construction.

The Model HD-10 hydraulic hoist is an underbody hoist with a double equalizing arm operated by a 10-inch-diameter hydraulic cylinder with a 22-inch stroke and is recommended by the manufacturer for use on heavy-duty trucks, tandem and trailer dumps. For medium-duty service, Model 626 and 726 are particularly adaptable to long-wheelbase trucks. These have 6 and 7-inch-diameter cylinders respectively, with 20¼-inch strokes. Models 621 and 721 are designed for short-wheelbase light-duty trucks, and also have 6 and 7-inch-diameter cylinders.

The line of Marion bodies includes a wide variety of types. Of particular interest to contractors and highway departments are the straight-side general-purpose contractor's type, with double gussets and double-acting tail-gate, and the heavy-duty contractor's body. A feature of these bodies is the new Marion combination tail-gate hinge.

Copies of the newest literature featurturing these Marion hoists and bodies may be secured by interested contractors and highway engineers by writing direct to the manufacturer and mentioning this review.

Nominees for 1945 Officers of ARBA

Nominations for officers of the American Road Builders' Association for the year 1945, as submitted by the nominating committee appointed at the Chicago meeting, are as follows: President, James J. Skelly, James J. Skelly Co., Media, Pa.; Vice Presidents, Paul B. Reinhold, Reinhold & Co., Inc., Pittsburgh, Pa., W. A. Young, Cornell-Young Co., Macon, Ga., E. R. Galvin, Tyson Bearing Corp., Massillon, Ohio, and C. H. Purcell, California Department of Public Works, Sacramento, Calif.; Treasurer, H. C. Whitehurst, District of Columbia Director of Highways, Washington, D. C.

The following were nominated to serve as Directors for the years 1945-1948: T. H. Cutler, Kentucky Department of Highways, Frankfort, Ky.; E. S. Gillette, *Roads and Streets*, Chicago, Ill.; O. S. Hess, Kent County Road Commission, Grand Rapids, Mich.; H. C. Hofheimer II, Highway Contractors, Inc., Norfolk, Va.; Theodore Reed Kendall, CONTRACTORS AND ENGINEERS MONTHLY, New York, N. Y.; H. G. Sours, Ohio Department of Highways, Columbus, Ohio; and Carl O. Wold, Caterpillar Tractor Co., Peoria, Ill.

Skilsaw Official Dies

J. W. Sullivan, Chairman of the Board of Skilsaw, Inc., died at his home in Evanston, Ill., on October 26. He was 73 years old. Mr. Sullivan was the founder of Skilsaw, Inc., manufacturer of portable electric tools. He became President of the firm in 1926 and was elected Chairman of the Board in 1942 when his son, Bolton Sullivan, was appointed President of the company. Up to a short time before his death, Mr. Sullivan was an active force in directing the company's production and sales policy.

BAILY CONCRETE VIBRATORS

PAVEMENT VIBRATORS

Three types: *Vibrating screed*, full-width, propelled by hand-operated winch and cable or pushed ahead by finishing machine. Gasoline power plant.

Tubular internal, extending entirely across slab, mounted in front of finisher. Gasoline or electric power plant with flexible shaft drive.

Vibrating pan, full-width, carried by two-wheeled trailer behind any standard finisher. Gasoline or electric power plant.

STRUCTURAL CONCRETE VIBRATORS

1, 3, and 4 H.P. gasoline, air-cooled, 4 cycle motors; flexible-shaft drive; interchangeable vibrator heads lubricated for life. Wheelbarrow carriers.

Pioneers in Concrete Vibrators

BAILY VIBRATOR CO.
1539 WOOD STREET, PHILADELPHIA, PA.

TOUGH WA… CONDITIONS EQUIPMEN…

Before the war, Standard Steel's Paving Plants made outstanding production records throughout the country in bituminous road construction. With war, this equipment has played and is playing an important role in the building of many, many airports, both at home and abroad. Performance under the toughest kind of operating conditions has proved the efficiency of this equipment. Not satisfied, however, Standard Steel engineers have plans, already past the drawing board stage, for increasing even more the effectiveness of these great paving plants. It will behoove contractors to keep an eye out for Standard Steel's post-war line of road machinery.

OTHER STANDARD ROAD CONSTRUCTION EQUIPMENT: ROLLERS, SUBGRADERS, BATCHING PLANTS, DRYERS, FINISHERS, BROOMS

STANDARD STEEL CORPORATION
General Offices and Plant: 5001 South Boyle Avenue
Los Angeles 11, California

New Macadam Paving On Old Maine Road

Federal Gov't Pays for 1.8 Miles of Access Road To Serve Houlton Airport; State Handles Contract

(*Photo on page 84*)

✦ WITH the increasing importance of the Houlton, Maine, airport, 2 miles east of the village and close to the Canadian border, the Federal government has arranged to pay the State of Maine for the cost of paving a particularly poor section of roadway through the village of Houlton. Last year the stretch from the village to the airport was paved. The 1.8-mile section of road described in this article is being built by contract under the supervision of the Maine State Highway Commission.

The old road was gravel surface-treated, while the new highway will have a 22-foot-wide section of 18-inch gravel base, with a 5-inch foundation course of crushed stone, topped by a 3-inch surface of bituminous macadam. On each side of this pavement will be 7-foot shoulders of a 2-inch pre-mixed tar-gravel surface course resting on a 24-inch gravel base. Concrete curbs run the entire length of the job 36 feet between faces.

Rock Cuts

Excavation was started in November, 1943, but the Maine winter closed in and operations were suspended on December 15, to be resumed May 9, 1944. Excavation, except structure excavation, was unclassified. A great deal of hard ledge rock was encountered in excavating the trenches for the 12 to 24-inch concrete drainage pipe which parallel the road. Blasting was required constantly.

Two Ingersoll-Rand portable compressors drove jackhammers with drill steel up to 8 feet in length. The drilled holes were plugged with straw to keep out dirt before inserting the dynamite. From four to eight sticks of Hercules Extra dynamite of 40 per cent strength were put in each hole and carefully tamped with loam. When blasting, a 12-foot-square woven wire mat weighing 2 tons was placed over the area to be dynamited to keep loose rocks from flying around the village. The blasts lifted the mat but the rocks were confined within the blasting area. The mat was moved about by a Lorain 75-B 1½-yard gas shovel which, with an Erie ¾-yard clamshell bucket, and a General ¾-yard backfiller, handled the excavation and filling the trench.

Plain concrete pipe in 4-foot lengths was used. The sizes employed were 12, 15, 18 and 24-inch with bell-and-spigot joints sealed with cement.

Home-Made Pipe Handler

The contractor devised a novel and effective way of handling pipe. An International truck was fitted out with a 15-foot boom of 8-inch-diameter maple log. This was secured to the front end of the truck by a 4-foot section of 4 x 4 x ½-inch angle iron which was bolted to the front end of the frame. The boom was attached to the angle iron by a hinge joint consisting of two 15-inch steel straps. In each forward corner of the body of the truck was bolted vertically another 4-foot section of 4 x 4 x ½-inch angle iron with a hole burned near the top to allow free passage of a ⅝-inch wire rope. Two wire cables were carried from the tip of the boom back through the holes in the angle irons and were secured to the truck body in the rear. Gravel ballast was placed in the back of the body. As the body of the truck was raised, as for dumping, the boom rose and when the truck body was lowered, the boom descended. This arrangement, which could lift a 1-ton load, was found extremely useful in maneuvering the heavy lengths of concrete pipe and laying them in the trench.

C. & E. M. Photo

Ingenuity in laying pipe—a truck-mounted boom operated by the dump body makes a handy tool for H. E. Sargent, contractor of Stillwater, Maine, on an access road to the airport near Houlton, Maine.

Concrete Curbing

The concrete curb extending the length of the job, 18 feet from the center line, was cast in place in 10-foot sections, with expansion joints every 40 feet. The curb is 6 inches wide at the top, 12 inches at the bottom, 2 feet high with a 3-inch batter to the front and back face, and extends 6 inches above grade. Curb forms were made from 1½ x 6-inch white-pine boards planed on

(*Continued on page 62*)

The best planner for your personal postwar security is yourself. And probably the wisest plan you can adopt is to invest every extra dollar you can lay your hands on into War Bonds—where they become double-duty dollars. They help finance the war and they'll be useful to yourself and the nation after the war.

Heavy hauls really ROLL on this TIME-PROVED TOUGHER TREAD

GOODYEAR ALL-WEATHER EARTH-MOVERS keep this LaPlant Choate CARRIMOR working fully up to its name.

MORE AND MORE contractors now buy Goodyear All-Weather Earth-Movers for drawn units because they know that this great work tire gives them maximum flotation — keeps their *heaviest* loads moving free and fast.

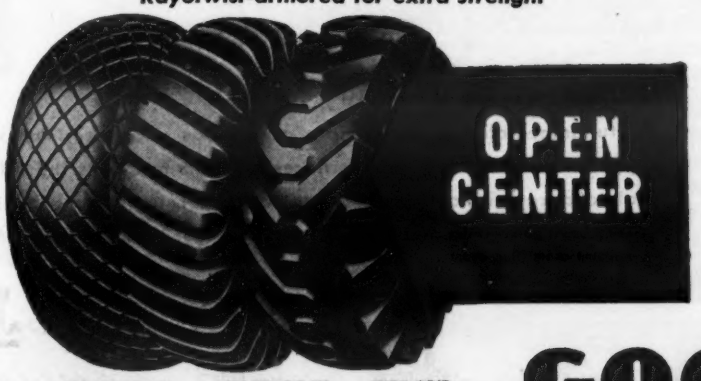
That's because the rugged, job-proved All-Weather tread of this BIGGER tire extends over the shoulders *to the center of the sidewalls* —provides side traction, prevents side slip on grades.

Its wider tread channels and rounded, sturdy diamonds assure complete self-cleaning and protection against snagging. And its tougher bead construction provides security against rocking, chafing and rim cutting.

Now super-armored with Goodyear's patented Rayotwist cord—*the strongest body we've ever used in a work tire*—these Goodyear off-the-road giants are by far the finest that can be built from synthetic and permissible natural rubber available today. They deliver more ton-miles of heavy-duty service because they are the longest-lasting, hardest-working tires available.

For proof of that, talk to the men now using them. Once you do, you will want Goodyears on all your units.

THE RIGHT TIRE FOR EVERY JOB
Rayotwist-armored for extra strength



ALL-WEATHER EARTH-MOVER for drawn vehicles
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PRODUCTS OF GOODYEAR RESEARCH

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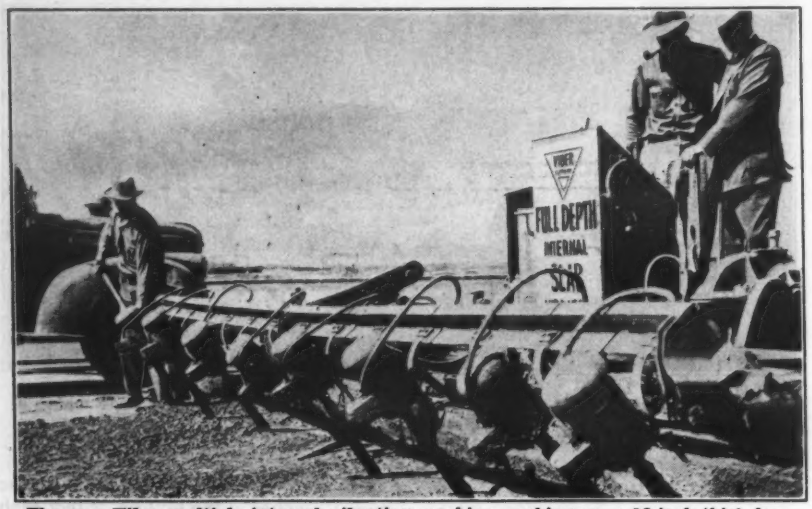
All-Weather, Rayotwist, Sure-Grip—T.M.'s The Goodyear Tire & Rubber Company

GOODYEAR
THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND



The new Viber multiple internal vibrating machine working on a 12-inch-thick low-slump concrete runway slab at Lindbergh Field, Calif.

Full-Depth Vibration For Concrete Slabs

With the constantly increasing weights of airplanes and anticipated weights of 100 to 150 tons in the early post-war period, concrete engineers are giving more thought to the proper laying and consolidation of the thicker concrete slabs required for these runways. Military engineers have found that concrete slabs more than 8 inches thick are generally inferior in the lower portion, due to difficulties in vibrating concrete of that depth.

Supplementing its line of electric, pneumatic, and gasoline vibrating machines for concrete construction, The Viber Co., 726 South Flower St., Burbank, Calif., has, after six years of experimental research, developed a new multiple high-speed internal full-depth slab vibrating machine, adapted especially for heavy-duty airport runways, warm-up aprons, turnarounds, and post-war extra-deep concrete highways for heavy-duty hauling. This new vibrating machine was given a thorough work-out in the construction of the new 8,500-foot runway at Lindbergh Field, Calif., where a concrete mix with 5½ sacks of cement per cubic yard, a 3-inch maximum-sized aggregate, and a 2-inch maximum slump was specified. Approximately 2,000 cubic yards of this concrete were placed in a 10-hour shift with the new Viber machine operating between 10 and 15 per cent of the time, using eight 3-inch-diameter vibrators working on the 12-inch slab 25 feet wide.

The manufacturer states that this new machine is free from breakdowns and excessive maintenance costs and will operate in low-slump concrete of 1-inch or less, producing strengths heretofore unobtainable at low cost. Only one man is required to operate the machine which can vibrate concrete at a travel rate of from 0 to 22 feet per minute. The 25-foot-wide bar lift to which the battery of vibrators is attached is hydraulically controlled, permitting the operator to position the vibrators easily as the machine approaches expansion joints and other obstacles. These controls are so arranged as to permit full-depth vibration of the concrete up to the expansion joint, then the vibrators are lifted to clear the joint, and the machine is driven forward sufficiently to submerge the vibrators again under the oscillating screed of the finishing machine. The machine is designed to use eight to eighteen internal high-speed vibrators operating at 9,500 rpm, depending on the job requirements to give full-depth vibration to the slab regardless of the thickness.

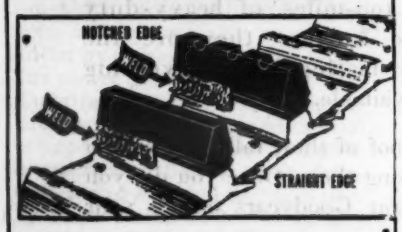
Complete information, including specifications and prices of this new concrete vibrating unit, may be secured direct from the manufacturer by mentioning this descriptive text.

Keeping Black-Top Roads in Condition

Highway engineers and superintendents are interested in black-top equipment which gives low-cost operation for the repair of bituminous roads, runways, and highways. Littleford Brothers, Inc., 485 E. Pearl St., Cincinnati 2, Ohio, has recently issued a new illustrated folder, W-642, which is a big help to road men in checking over bituminous maintenance equipment. The folder covers the Littleford Trail-O-Roller, Utility spray tank with either hand or power spray attachment, full-sized truck-mounted distributors, emulsion sprayers, hand pouring pots, and quick-heating tar and asphalt kettles.

Copies of this folder may be secured direct from the manufacturer by mentioning this news item.

Rebuild your
TRACTOR GROUSERS
WITH BULLDOG
Grip-Lugs



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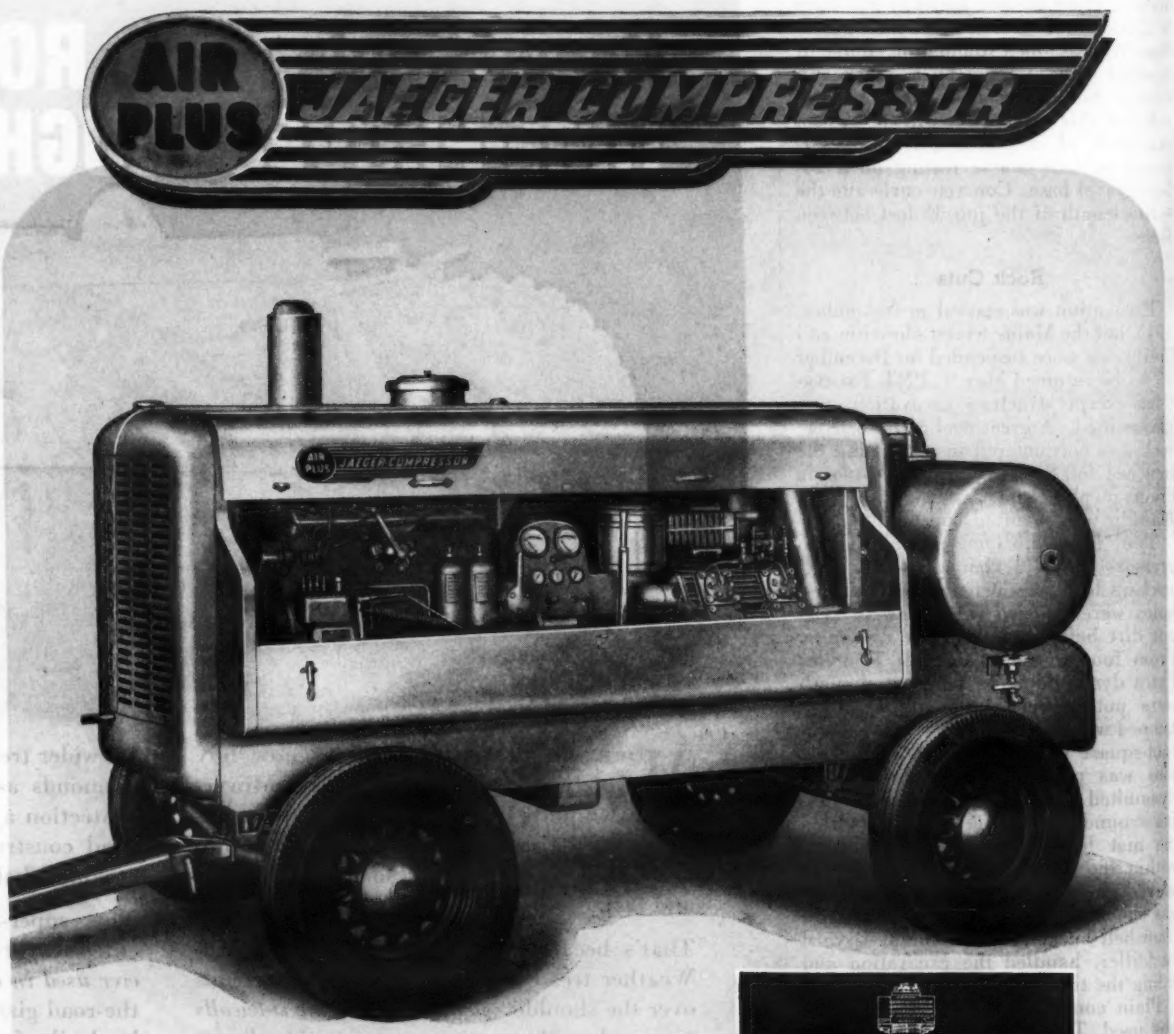
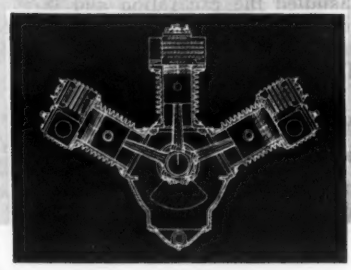
AIR PLUS JAEGER COMPRESSOR



BUILT IN A BALANCED "W" TO GIVE YOU S-M-O-O-T-H-E-R PERFORMANCE — COMPLETE ACCESSIBILITY OF EVERY PART



By fundamentally correct design, as well as micro-precision workmanship (parts honed and lapped to aircraft engine tolerances), Jaeger provides the efficiency, stamina and ease of maintenance you have always wanted in air compressors. Identified by the name "AIR PLUS". All sizes, from 60 to 500 feet. . . THE JAEGER MACHINE COMPANY, COLUMBUS 16, OHIO.

"FLEET-FOOT" Crane-Loaders

"SPEEDLINE" Concrete Mixers

"SURE PRIME" Contractors Pumps

JAEGER Engineered EQUIPMENT

JAEGER-LAKEWOOD SPREADERS, FINISHERS AND BITUMINOUS PAVERS, FORMS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS, AGITATORS—JAEGER HOISTING ENGINES, TOWERS

Maintenance Methods In Oakland County

Michigan County Maintains 190 Miles of State Roads As Well as County Roads; Tar Patches, Resurfacing

(*Photo on page 84*)

ALTHOUGH new construction has been practically discontinued because of Federal priorities, Oakland County, Mich., is not neglecting its 2,416 miles of highway system which serve this playground of southeastern Michigan. Located just north of Detroit, Oakland County has been justly famous as the "Land O'Lakes", with some four hundred spotted over 900 square miles. While passenger traffic may have lessened somewhat in the last couple of years, the war has served to expand the industrial area around the automobile manufacturing city of Pontiac, with the result that no slackening of road maintenance is possible with heavy trucks continually pounding over the county highways.

The only construction under contract this year was for bituminous-concrete surfacing along a concrete-paved section of U. S. 10, which was completed last spring. This job was done for the Michigan State Highway Department which reimbursed the county for the cost. The contract was awarded to the Ann Arbor Construction Co. for $98,423.10.

As a result of the discontinuance of new road work, a post-war fund is being created which will be available for much needed improvements and to provide employment. In the meantime the twelve cities, thirteen villages, and twenty-five townships situated in this quadrangular-shaped county, 30 miles long by 30 miles wide, are being provided with adequately maintained highways.

Highways Maintained in 1944

The mileages of roads and subdivision streets under maintenance by the Oakland County Road Commission in 1944 are as follows:

State and Federal Roads	
Concrete	125.93 miles
Bituminous	61.66 miles
Gravel	2.10 miles
Total	189.69 miles

County Roads, Primary	
Concrete	290.69 miles
Bituminous	163.46 miles
Gravel	180.02 miles
Total	634.17 miles

County Roads, Secondary (Township and Subdivision Streets)	
Gravel, earth, etc.	1,539.80 miles
Bituminous	52.80 miles
Total	1,592.60 miles
Grand Total	2,416.46 miles

Oakland County was paid $166,008 by the Michigan State Highway Department for maintaining 189.69 miles of state trunk-line highways in 1944. These roads are of various widths, but this is equivalent to 275.5 miles of 20-foot pavement.

County Organization

To keep these roads in good condition, a smooth-running efficient organization is necessary. The Oakland County Road Commission is headed by three commissioners: Lee O. Brooks, Chairman, Luther D. Allen, and Sol D. Lomerson. Leon V. Belknap is Engineer-Manager. For more decentralized handling of maintenance work, the county is subdivided into four districts of equal area, each with its own garage and maintenance equipment. They are located at Orion, Davisburg, Highland, and Pontiac, and employ a total of 190 men.

Visual surveys are made in the spring to determine which roads are in need of immediate maintenance. In addition to routine work, county maintenance forces have improved drainage ditches and resurfaced with gravel many miles of roads affected by frost action in the spring break-up. Some bituminous-surfaced roads require base repair as well as replacement of surfaces.

C. & E. M. Photo

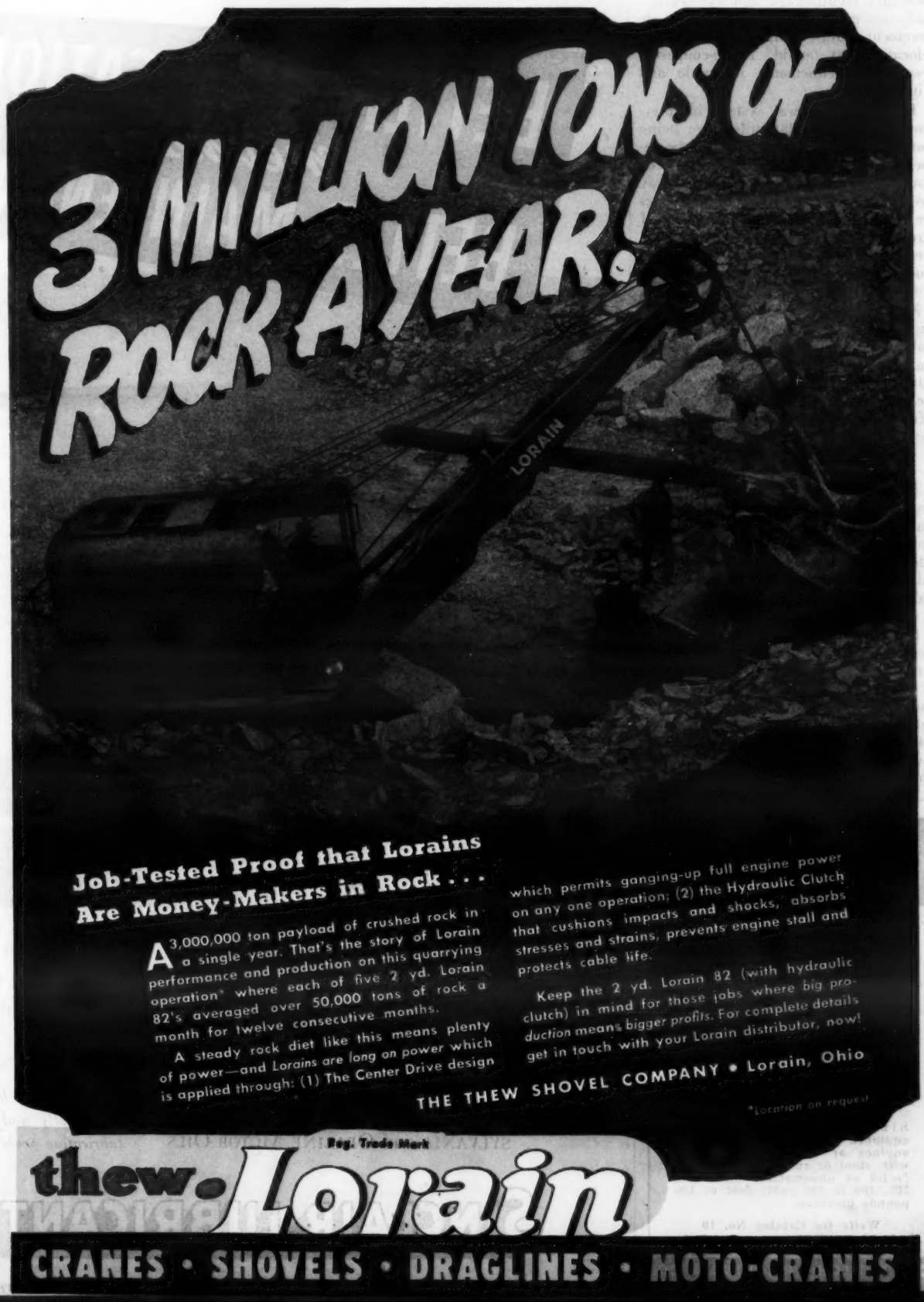
An Oakland County, Mich., patching crew repairing a concrete pavement on Twelve Mile Road near U. S. 24.

Gravel Surfacing

The secondary roads which comprise the bulk of any county road system are not being forgotten in Oakland County. A contract was awarded this year to E. P. Brady, Flint, Mich., for $32,630 for processing 51,000 cubic yards of road maintenance gravel in various gravel pits throughout the county. This processing eliminates a portion of the sand by screening and also crushes the gravel to a ¾-inch or less size. The contractor uses a Pioneer portable No.

(*Concluded on page 22*)

For 68 Years Builders of Fine WHEEL BARROWS:
AMERICAN
STEEL SCRAPER CO.
Sidney, Ohio
Watch for Post-War Models



Job-Tested Proof that Lorains Are Money-Makers in Rock . . .

A 3,000,000 ton payload of crushed rock in a single year. That's the story of Lorain performance and production on this quarrying operation* where each of five 2 yd. Lorain 82's averaged over 50,000 tons of rock a month for twelve consecutive months.

A steady rock diet like this means plenty of power—and *Lorains are long on power* which is applied through: (1) The Center Drive design which permits ganging-up full engine power on any one operation; (2) the Hydraulic Clutch that cushions impacts and shocks, absorbs stresses and strains, prevents engine stall and protects cable life.

Keep the 2 yd. Lorain 82 (with hydraulic clutch) in mind for those jobs where *big production means bigger profits*. For complete details get in touch with your Lorain distributor, now!

THE THEW SHOVEL COMPANY • Lorain, Ohio

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Maryland Roads To Be Modernized

State Roads Commission Has Post-War Program to Improve 155 Miles and Build 70 Miles of Highway

By AUSTIN F. SHURE, Assistant to the Chief Engineer, Maryland State Roads Commission

✦ THE State Roads Commission of Maryland has in contemplation a program for highway and bridge construction after the war, which will modernize where most needed the 4,400-mile Federal and state highway system. This will be done by rebuilding approximately 155 miles of highways and providing extensions to the system totaling approximately 70 miles. Plans are being made for constructing into the system the most necessary facilities for highway service, such as grade separations, adequate pavement widths, additional travel lanes, relocation to avoid traffic-congested areas, and refinements in grade and alignment.

The county highway systems in Maryland, totaling 11,000 miles, are being considered for improvement by the respective County Commissioners or County Road Boards, and the highway governing bodies in the municipalities are considering improvements of through traffic lanes in cities and urban areas, most important of which are the much needed developments through and around the City of Baltimore.

Modernization of the Interregional Highway System in Maryland, which embraces a total of 235 miles of the Federal and state system, is proposed to the extent of approximately 60 per cent of the mileage, and includes the building of a freeway between Baltimore and Washington.

Funds for the Program

The Commission is prepared to match any probable amount of Federal funds that might be made available for Maryland by the Congress. Maryland's rather extensive program was prepared originally in contemplation of the passage of Federal highway legislation which had as its financial basis a Federal program to provide $3,000,000,000 to be spent at the rate of $1,000,000,000 a year for a period of three years and made available on the basis of 75 per cent as the Federal share and 25 per cent provided by the state or other governmental agencies. Maryland's share of these funds would have approximated $10,000,000 a year, amounting to $30,000,000 over a three-year period. The Commission was prepared to match this expenditure on the basis originally proposed, which would have increased the total available funds to $40,000,000. Further increases in funds were possible because of city, county and state allocations, which would have brought the total to $50,000,000. Because, however, of recent enactments by the Congress in the passage of the Hayden Post-War Highway Bill, it appears very likely that Maryland's share of the Federal funds will be reduced from the originally contemplated amount of $10,000,000 annually to approximately $4,400,000, in which event the annual expenditures for new construction would not be increased more than 25 per cent over the normal expenditure of the pre-war years.

One of Maryland's modern thoroughfares, the Governor Albert C. Ritchie Highway, typical of the design to be used in post-war construction of main routes.

Apparently, therefore, because of the reduction in the available funds, construction and betterments now proposed will be extended over a much greater period of time.

Status of Planning

The Commission's forces have been very actively engaged in the preparation of the plans for a very extensive post-war program. It has been able, because of this activity, to release urgently needed construction projects and work which had been approved by the War Production Board for immediate construction during the year 1944, totaling approximately $2,000,000, and the preliminary engineering work has progressed to that

(*Concluded on page* 49)

OK PORTABLE AIR COMPRESSORS

Single-stage or two-stage; equipped with gasoline or diesel engines or electric motors, and with steel or rubber-tired wheels (solid or pneumatic). Sizes: 85, 105, 160 to 210 cubic feet at 100 pounds pressure.

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Desirable territories open for dealers

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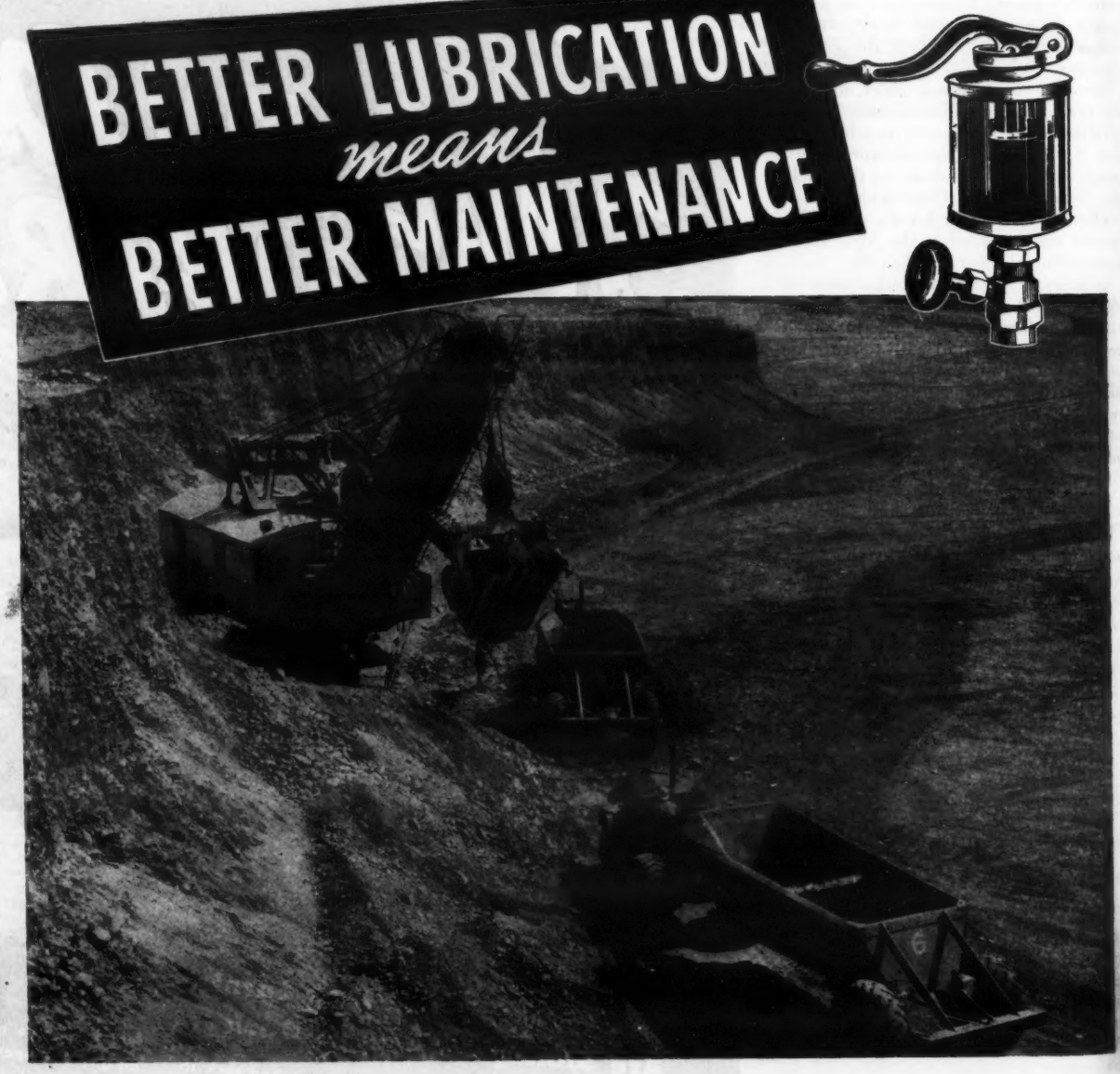

IF you are experiencing difficult maintenance, better check lubrication. It may be inadequate with resultant excessive wear.

Sinclair offers better lubrication for better maintenance. SINCLAIR PENNSYLVANIA and OPALINE MOTOR OILS give safe lubrication in the hard grind of full load operation. TEN-OL 200 efficiently lubricates Diesel-powered equipment.

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(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)

SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

Marlow Pumps Has New Georgia Representative

Marlow Pumps has announced the appointment of Tractor & Machinery Co., 351 Whitehall St., S. W., Atlanta, Ga., as distributor for its entire line in the Atlanta and western Georgia territory. A. E. Hahnan, head of the Tractor & Machinery Co., is Vice President of Associated Equipment Distributors.

Marlow Pumps, whose factory is in Ridgewood, N. J., manufactures a large line of contractors' pumps, including both diaphragm and self-priming centrifugal types.

Soil-Testing Procedures

A 210-page compilation giving thirty-eight suggested new procedures for investigating soils and soil mixtures, in addition to all of the standard methods of the American Society for Testing Materials, has been issued by the Society as a result of the intensive work of its Committee D-18 on Soils for Engineering Purposes. The book is arranged in five sections with standard tests, if any, covered first under each section, then followed by the suggested methods. The five parts are as follows: Part I, Indicator Tests on Soils; Part II, Compaction and Consolidation Tests on Soils; Part III, Strength Tests on Soils; Part IV, Tests for Soil-Cement; and Part V, Tests for Soil-Bituminous Mixtures.

Copies of this publication, in heavy paper binding, can be obtained from A.S.T.M. headquarters, 260 So. Broad St., Philadelphia 2, Pa., at $2.25 each.

George M. Etnyre Resigns

George M. Etnyre, who has been General Manager, Secretary and Treasurer of E. D. Etnyre & Co., Oregon, Ill., for many years has resigned his offices in the company. The Board of Directors regretfully accepted his resignation and has elected Joseph W. McCoy as Secretary and Treasurer.

TO MOVE MORE YARDAGE CHEAPER ON TOMORROW'S LONGER HAULS

REPLACE OBSOLETE, ONE-PURPOSE RIGS with TOURNAPULLS

You'll Require Less Equipment Investment . . . Can Handle Longer Jobs or More of Them with the Fewer Rigs . . . Try it.

Postwar construction plans for rebuilding, relocating and widening highways; for lengthening airports; and for reclamation projects definitely show the trend is to longer-haul earthmoving. To profitably handle these longer-haul jobs of tomorrow, you'll need equipment that can move big yardages fast. Tournapulls are the answer.

With Tournapulls you use the same cable-controlled, positive-ejection type Carryall Scraper that has proved so successful with tractors in the past, but you use it faster. You get the same one-man loading, hauling and spreading efficiency, plus off-road truck hauling speeds. You eliminate expensive one-purpose loading tools and cut out costly, idle waiting time in the borrow pit. Result: You move bigger yardages faster on hauls from 300′ to 3 miles . . . same time cut equipment investment almost in half.

Big tires enable Tournapulls to go practically anywhere you can go with tracks, but good haul roads like this enable you to move 10 to 20% more yardage hourly with same hauling equipment. Tournapull shown is working on Alaskan Highway.

Rubber-Tired Power Benefits

Tournapull design concentrates weight and power on two big, rubber-tired drive wheels to give you greater traction and maximum flotation and quick turning. These big drive tires (21 x 24) will take heavy loads over ground where normal-tired equipment bogs down. What's more, your big tires have practically no wearing parts . . . also cushion equipment against shock and reduce operator fatigue.

See Your LeTourneau Dealer

Why use one-purpose loading and hauling rigs or slow-moving crawler equipment, when you can move more yardage, more profitably with Tournapulls? See your LeTourneau distributor . . . he can help you get Tournapulls NOW for essential jobs.

Tournapulls spread their loads evenly and accurately while moving. Big tires aid compaction, enable you to travel over concrete runways. This Tournapull is fine grading between forms at Muroc Airfield in California.

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2400 Now in Use by Alert Earthmovers

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Manufacturers of TOURNAPULLS*, ANGLE-DOZERS*, BULLDOZERS, TILTDOZERS*, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, TOURNATRAILERS*, TOURNACRANES*, TOURNATRUCKS*, SHEEP'S FOOT ROLLERS, TOURNAROPE*, TOURNAWELD*, TOURNALIFTS*.
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RUBBER-TIRED POWER FOR FASTER EARTHMOVING

Winter Preparedness Is Good Insurance

Connecticut Cuts Costs And Increases Safety of Maintenance and Traffic By All-Year Planning

By THEODORE REED KENDALL, Editor

(*Photos on page 84*)

✦ IN dealing with all snow and ice conditions, the Bureau of Maintenance of the Connecticut State Highway Department aims to provide, within a reasonable cost, the greatest aid to the greatest number of the traveling public. This is effected through careful organization and planning for the winter's snow and ice conditions, an extensive program of pre-winter preparation, and post-winter adjustments.

Pre-Winter Preparation

By the first of November of each year, the District Supervisors organize their forces so that each district has ready for ice and snow work a definite plan of action whereby all roads are cataloged and each man and each piece of equipment has a definite job and territorial assignment. Each year during the summer and early autumn, the Supervisors arrange that all equipment to be used on ice and snow work is overhauled and in readiness for immediate use by November 15.

Arrangements are made in each district for a source of supply and for the storage of sufficient sand for combating icy conditions on the roads. The sand must conform with specifications approved by the Director of Maintenance and the storage locations are so planned that sand is readily available when required. Special care is taken to place sand near steep hills and other locations which experience has demonstrated are especially hazardous under icy conditions.

All important drainage outlets which are likely to be hidden under snow and ice are marked conspicuously with concrete posts, so that they can be located readily by maintenance crews at any time during the winter.

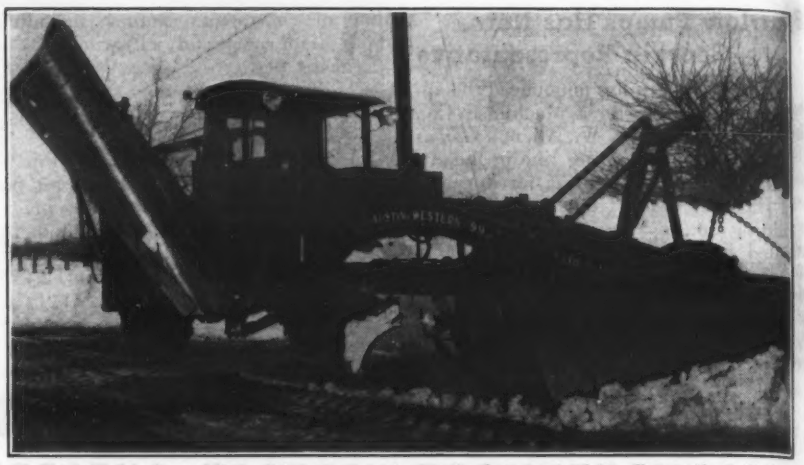
Snow fences, designed to specifications approved by the Director of Maintenance, are erected in the fall of each year, prior to frost. They are placed, when possible, at all locations where experience has shown that excessive drifting is likely to occur. They are so placed as to combat most effectively the wind currents of prevailing storms, and are not erected on private property until the owner's consent has been obtained. The Supervisors keep, from year to year, a list showing the length of each fence and its exact location.

Snow Removal

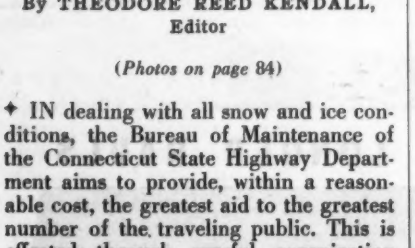
Snow plowing starts as soon as the snowfall in any storm is of a sufficient depth for equipment to work. Snow is plowed from the travel way onto the shoulders as long as snow continues to fall. Windrows which are formed at railroad crossings are removed immediately.

After snow has ceased falling, and the travel way is clear, the snow accumulated on the shoulders is pushed back off the shoulders as far as practicable, care being taken not to block private driveways and mail-box turn-outs which owners may have already cleared. Drainage out-

(*Continued on page 40*)



An A-W 99 motor grader with one-way plow and wing, part of the Connecticut State Highway Department's snow-removal fleet.



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Protection when you need it can save many man hours on the job. FULTEX Waterproof Tarpaulins and Covers are well known and widely used. They have proven their quality through heavy duty and long wear. You get your money's worth when you buy FULTEX.

Quick delivery from stock on standard size covers.

FULTON BAG & COTTON MILLS

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Ready Now!

TOMORROW'S KARRY-SKRAPER

KEEPING PACE WITH YOUR DEMANDS FOR FASTER DIRT MOVING, WE PRESENT A LINE OF KARRY-SKRAPERS THAT WILL MEET YOUR EVERY DEMAND FOR . . .

Fine Performance
Heaping Loads
Maneuverability

HERE ARE FEATURES YOU WANT IN TOMORROW'S SCRAPER

- Positive Ejection Gate that will not jamb when operating in clay or adobe.
- Front Apron not affected by raising or lowering the bowl while on way to fill.
- Cable protection against spill-over dirt no matter how high load is crowned. Insures long cable life.
- New Multiple Sheave Arrangement that gives true cable alignment. An effective cable and sheave saver.
- Ejection Gate that indicates the end of its stroke and eliminates a source of undue cable strain.
- Fairlead System on front of Karry-Skraper really leads fair no matter how short the turn.
- Neat Appearance and performance. We are proud of tomorrow's Karry-Skraper. You will be proud of it, too.

"Tomorrow" is not far off. Why not investigate this unit that will help you cut corners on dirt moving. See your tractor dealer or write us for complete information.

The Kohle Power Unit that holds adjustment over longer periods of continuous operation. It's simple and dependable.

16 AWARDS IN WAR PRODUCTION

ISAACSON

SEATTLE

ENGINEERED TRACTOR EQUIPMENT

Ball-Bearing Practices For Maintenance Men

The Marlin-Rockwell Corp., Jamestown, N. Y., has prepared an 8½ x 11-inch indexed folder on "Ball-Bearing Practices for the Shop Man". The twenty-seven bulletins in this folder cover "what every shop man should know about ball bearings", such as the handling of bearings both in the receiving and stock rooms and during assembly, the preparation of shafts for mounting of bearings, instructions for removing bearings from shafts, lubricants for ball bearings, types of ball-bearing mountings, snap-ring bearings, and M-R-C ball-bearing interchangeable tables.

Sets of these bulletins may be secured by any state or county highway department shop man or contractor's master mechanic by writing on your business letterhead direct to the manufacturer and mentioning this item in CONTRACTORS AND ENGINEERS MONTHLY.

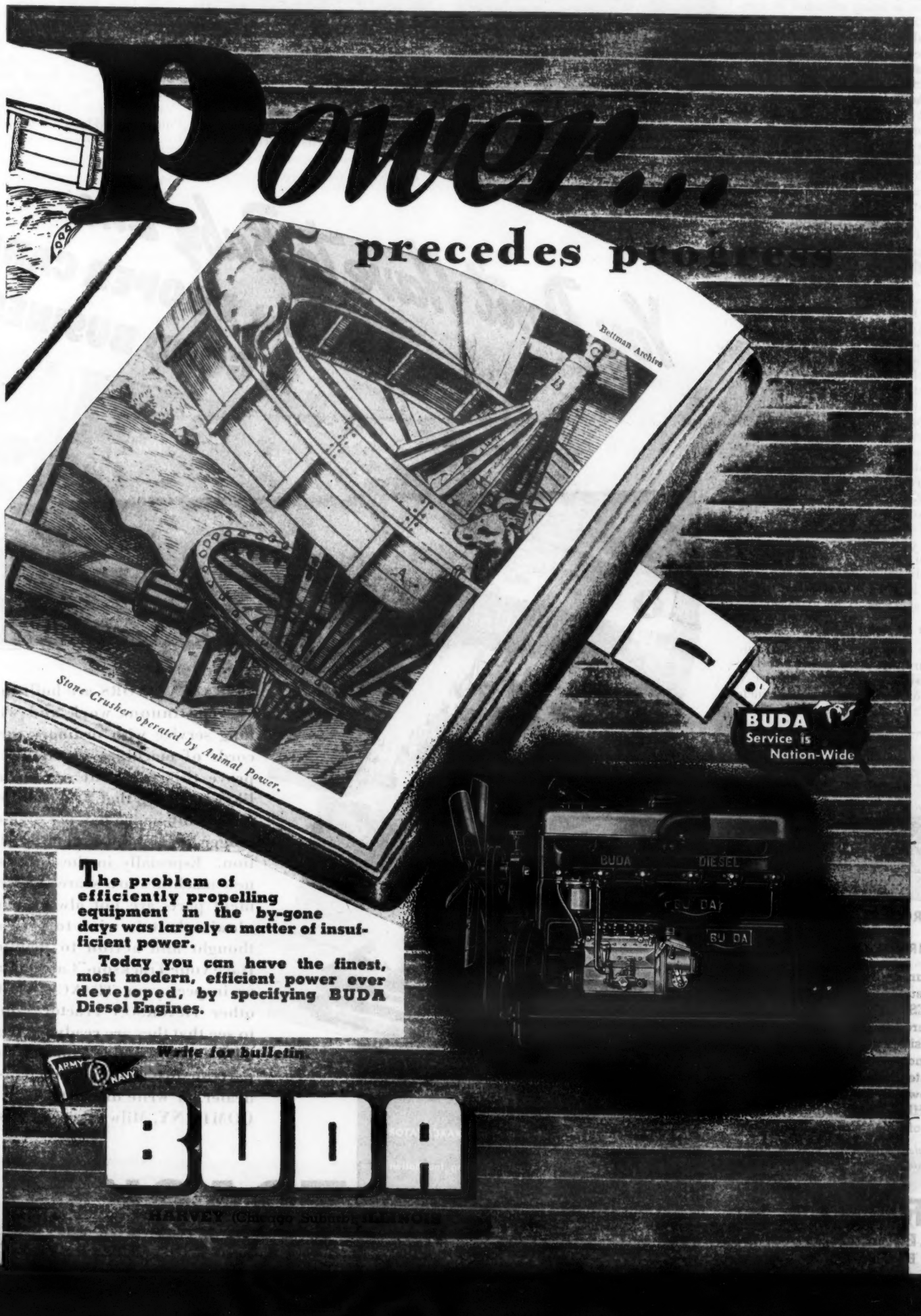
Changes in Personnel Of Borg-Warner Corp.

Arthur P. Emmert, former Vice President in charge of manufacturing, has been named President of the Warner Gear Division of the Borg-Warner Corp., according to a recent announcement. In heading the Division, Mr. Emmert succeeds C. S. Davis, Borg-Warner President, who will now devote his entire time to the parent corporation in Chicago.

Other staff changes are the appointments of E. S. Russey as Vice President and General Manager and J. O. Moore as Works Manager. Mr. Russey succeeds John M. Simpson, who has retired from active duty but will serve as Chairman of the Supervisory Board and consultant in administration and engineering problems of the Division.

Wire Rope Experience Found in New Bulletin

The fifth issue of "Ropeology", a new publication of the Macwhyte Co., 2966 Fourteenth Ave., Kenosha, Wis., contains many interesting facts with illustrations about the use of wire rope, and also a question-and-answer column written with a punch. Regular issues of Ropeology, as well as copies of Macwhyte's eighteen helpful articles on wire rope conservation, Book No. 43-85, will be sent free to readers of CONTRACTORS AND ENGINEERS MONTHLY writing direct to Macwhyte and mentioning this item.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Wellpoints Dry Site Of New Power Plant

(*Continued from page 1*)

was completed in May, 1938. All generator sets are Westinghouse.

New Addition

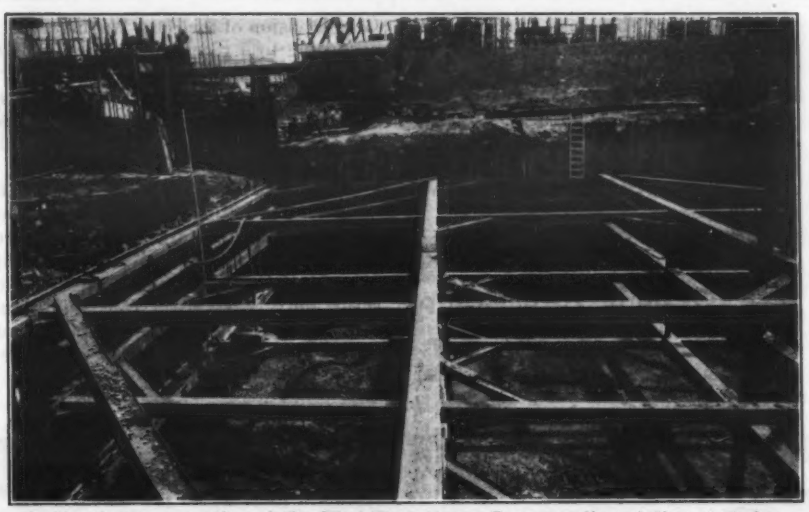
On June 21, 1944, Sanderson & Porter, engineers and constructors of New York City, began the latest addition which extends southward from the present plant. The present 60-foot-wide turbine room is being extended 90 feet, while the 150-foot-wide boiler room is being extended about 100 feet. The tremendous weight of power-plant installations necessitates deep and solid foundations. Before the present plant was built, this land along the Allegheny was nothing but a swamp. Corduroy roads were laid during the early construction, and many a work horse that strayed off the log roadbed had to be rescued from the muck by being yanked out by a crane or winch.

The elevation of the top of this muck is 740 and it has a depth of 17 feet before hard gravel is found at Elev. 723. Rock is reached at Elev. 690. Over the years, this area has been filled in with cinders from the power plant to Elev. 756. A contract was awarded to McCrady & Rodgers of Pittsburgh to remove this 16-foot layer of cinder ash. Four LeTourneau 12-yard Carryalls pulled by Caterpillar D8 tractors moved the material ¼ mile to another part of the plant yard where cinders from the boiler rooms are used to fill in swampy areas.

Then work was started on excavating the muck itself. This so-called muck is actually rather impervious layers of blue and brown clay interspersed with some gravel. Five feet of material had been removed to Elev. 735 when the presence of ground water required the installation of a wellpoint system. The normal pool elevation of the Allegheny, which is only about 500 feet east of the excavation, is at Elev. 734.5, so considerable seepage was to be expected.

The Wellpoint System

A Griffin wellpoint system was installed encircling the entire job. The system consisted of 228 Griffin Jet'N Drive wellpoints with 23-foot x 1½-inch risers and swing joints, spaced usually at 4-foot intervals around 1,000 feet of 8-inch header suction line which was set at Elev. 735. The screen inlets in the risers were at Elev. 714 to 716. Water for driving the self-jetting wellpoints came from the discharge flume of the power plant, being pumped out by a Griffin Model 70AW two-stage centrifugal pump, rated at 300 gpm at 200 pounds pressure, with a 4-inch suction and 3-inch discharge line. Six men were used to install the system, one operating the pump for the jetting, and the remaining five on the wellpoints and pipe.



Turbine-house excavation at the West Penn Power Co. generating station at Springdale, Pa., showing the sheet piling and bracing, and the wellpoint header pipe suspended below the top I-beam brace.

Two discharge lines were used when the wellpoint system got under way; one, a 10-inch line 305 feet long with two Model 108 8-inch Griffin pumps powered by Waukesha gas engines, and the second, an 8-inch line 285 feet long with four Griffin Model 108 pumps, three driven by electric motors and the fourth by a Waukesha gas engine. The discharge went back into the river but had to pass over a concrete wall, part of the discharge flume, which is 12½ feet higher than the pumps. Sixteen valves completed the system. The vacuum on the 8-inch header line was main-

(*Continued on next page*)

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TRACTOR EQUIPMENT

Power Plant Requires Deep Heavy Foundations

(*Continued from preceding page*)

tained at 24 to 25 inches.

Excavation in the Dry

After pumping for several days, the soil became sufficiently dry so that power shovels could work on the surface, and excavation proceeded for the boiler-room and turbine-room foundations. The earth was moved by four cranes: a Northwest 71 diesel with an 80-foot boom and a 2-yard bucket, a Lorain 75 diesel with a 70-foot boom and a 1½-yard bucket, a Koehring 605 diesel with a 60-foot boom and a 1¼-yard bucket, and a Northwest 105 gas with a 40-foot boom and a 1-yard bucket. Twelve trucks of 2 and 3-yard capacity hauled the material ¼ mile to the regular cinder dump.

Excavation for the boiler room went down on 1½ to 1 slopes to Elev. 718.5. Excavation for the turbine-room foundation could not be similarly dug, however, for a large transformer yard at Elev. 757 paralleled the excavation only 35 feet to the east. Since no room for slope excavation was possible, a sheet-pile cofferdam was driven just outside the wellpoint system. Sheet piles, 40 feet long and 19 inches wide, were driven by a McKiernan-Terry No. 7 hammer, using steam from the power house.

Cofferdam and Bracing

When the sheeting was completed, excavation continued, and an elaborate system of bracing was installed to keep the cofferdam from springing or buckling. Running around the inside of the sheet piling were three tiers of rangers supported by 1¼-inch rods hung from the top of the sheeting. These rangers were 18-inch wide-flange 96-pound I-beams, spaced 6 feet vertically at Elev. 726, 732, and 738. Each tier was cross-braced by two parallel I-beams of like section running lengthwise the 70-foot dimension of the cofferdam, and by two parallel 10-inch wide-flange 64-pound I-beams across the 65-foot width of the cofferdam.

The header pipe of the wellpoint system within the cofferdam was hung directly beneath the top I-beam brace, and supported by flat steel brackets hung on the sheeting. Where the wellpoint risers ran alongside the walls of the existing boiler and turbine rooms, they were encased in 4-inch round iron pipe. This was done so that later concreting could proceed without disturbing the operation of the wellpoint system. The 4-inch pipes, of which 105 pieces of 6-foot length were needed, were left imbedded in the concrete while the risers and Griffin wellpoints were removed. Caps were then placed on the empty pipe sections and concreting completed.

The bottom of the condenser pit in the new turbine-room foundation is at different elevations because of the footing design. These went down to Elev. 712, 717, and 720, while some of the tunnel elevations went as low as 707. Another water hazard was the discharge from the existing station, which left the turbine room at the southeast end and passed within 2 feet of the new work on its way to the river.

Pouring the 6-foot-thick concrete foundation for the new boiler room at the Springdale, Pa., station of the West Penn Power Co.

Plant Construction

The foundation walls vary in thickness from 6 feet at the bottom to 2 feet at the top. In the turbine room, the bottom slab is 9 feet thick but underneath the new generator a 17-foot concrete foundation is required. The boiler-room foundation is 6 feet thick. Panel forms for concreting were ⅛-inch sheet steel, in different sizes, the average panel being 4 x 10 feet. These panels were backed by angle irons to which ¾-inch tie rods were attached to hold the forms in place while concreting. The rods were later cut off at the top and left imbedded in the concrete, while the steel panels were used repeatedly. Ten Airco acetylene welding and cutting tools and five Lincoln portable electric welders were used in setting the reinforcing steel.

The concrete is 3,000-pound strength, truck-mixed, and was hauled 2 miles from the River Sand & Gravel Co. at Springdale. The reinforcing steel came from W. N. Bambach in Pittsburgh. The proportions of a batch of concrete were:

Portland cement	520 lbs.
Sand	1,200 lbs.
Gravel	2,200 lbs.
	3,920 lbs.

The concrete was placed in the forms by chutes and then vibrated by three Mall vibrators. Concreting was begun

(*Concluded on page 28*)

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The 1,000th Model 200 "Fighting Osgood" for the U. S. Army Engineer Corps is inspected by Ed Belcher, Plant Superintendent (at left) and M. C. McNeil, President of The Osgood Co.

"Fighting Osgoods" Reach 1,000 Mark

Special exercises were held at the main plant of The Osgood Co., at Marion, Ohio, when Captain Charles Bolton of the Fifth Service Command accepted in the name of the Corps of Engineers, U. S. Army, the 1,000th Model 200 excavator to be completed for the armed services.

In this war as in the last, the entire production of The Osgood Co. has been devoted to the manufacture of shovels for the Army and Navy, Maritime Commission, Lend-Lease, and shipyards, and the company was among the first to earn the Army-Navy "E" which it has held since October 7, 1942. Assisting Osgood in its present production record are The Columbia Machinery & Engineering Co., Hamilton, Ohio, and Osgood's associate, The General Excavator Co., Marion, Ohio, which have been engaged in building Model 200's to Osgood specifications.

Interim Agreement On Surplus Property

W. L. Clayton, Surplus War Property Administrator, recently announced that he has concurred in a joint statement prepared by the principal government agencies which are concerned with surplus property disposal relative to how surplus property operations are to be conducted pending the appointment of the Surplus Property Board under the Surplus Property Act of 1944, and issuance by the Board of its regulations under that Act. The agencies concerned are the War Department, Navy Department, Treasury Department, Maritime Commission, Reconstruction Finance Corporation, Foreign Economic Administration, and the War Food Administration.

The Surplus Property Board will supersede the Surplus War Property Administration, created by Executive Order No. 9425, and will have general supervision and direction over surplus property. To avoid the interruption of surplus property operations during the interim period, Congress has recognized the necessity for the continued effectiveness, until superseded by regulations of the Board, of all policies and procedures relating to surplus property prescribed by the Surplus War Property Administration and the owning and disposal agencies which were in effect when the Act was signed on October 3, 1944, and which are not inconsistent with the Act.

The joint statement lists the provisions of the Act which are considered to be self-operative and which therefore became effective as soon as the Act was signed. It also lists those provisions of the Act which will not become effective until the issuance of regulations by the Board and which, therefore, are not inconsistent with existing policies and procedures of the Surplus War Property Administration and the respective owning and disposal agencies in effect on October 3, 1944.

New Chip Spreader Gives an Even Edge

A spreader attachment for dump trucks which deposits an even layer of sand or any other granular material from thin surfacing up to 2-inch layers, holding an even clean edge, has been developed by The Flink Co., Streator, Ill. This spreader does not deliver material beyond the limit desired because the sand is dropped and spread by gravity and not by throwing.

The spreader is attached to the rear of the dump truck and the rate of delivery is regulated by a lever so that a continuous uniform amount of material is forced by the agitator through the gate, falling into chute-like channels which automatically divide the material into equal portions and deliver it by gravity to the road. The operation of the spreader is controlled entirely by the truck driver.

The Flink sand and chip spreader is easily attached to all dump trucks. The maximum spread is 10 feet; however, standard adjustments provide for spreading 8 or 9 feet and special machines will also spread 3, 4 or 5 feet wide. Complete information and illustrations of this spreader will be found in a 2-page bulletin which may be secured direct from the manufacturer by mentioning this descriptive item.

Duffy Joins Foundation

E. E. Duffy has joined the staff of the Automotive Safety Foundation, Washington, D. C., according to an announcement by Pyke Johnson, President of the Foundation.

For the last 15 months, Mr. Duffy was Director of Public Relations for the American Road Builders' Association, and for two and a half years previously was Planning Secretary of the Wayne County Road Commission, Detroit. Prior to his Wayne County position, Mr. Duffy was for many years with the Portland Cement Association, Chicago, engaged in public relations activities in the highway and safety fields.

How capacity and tractor speed effect

SCRAPER PRODUCTION

For obvious reasons, the following LaPlant-Choate scraper yardage table is *not* intended for estimating specific jobs. Its main purpose is to give you a conservative measuring stick for figuring the relative advantage of higher tractor speeds, or larger scraper capacities, on various length hauls. As such, we hope you will find it helpful in estimating the size, type and number of tractor-scraper rigs you will need for your post-war dirt-moving projects. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

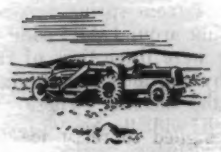
ESTIMATED PAY YARDS PER HOUR WITH PRESENT LaPLANT-CHOATE SCRAPERS*

Scraper Model	Tractor Size	Struck Yds. Per Trip	Load, Dump	Turn & Time	Length of Loaded Haul in Feet 250	500	750	1000	1500	2000	3000	4000	5000
C-74	D-7	9.5	2.5	min.	122	100	83	69	58	47			
C-84	D-8	13.6	2.5		145	117	97	88	64	50	41		
C-86	D-8	15.3	2.5		175	130	109	98	74	58	51	46	
C-104	D-8	25	3.5			172	148	123	100	88	70	55	45
CW-10	DW-10	8.75	2.5			125	102	92	88	81	73	64	54

*Based on a one-way haul on level grade with good dirt and well maintained hauling roads..(54 minute hour used to allow for unpredictable losses). Above figures will change considerably depending on the type and condition of the material you are loading. They also will vary with the condition and grade of the hauling road. Proper maintenance of hauling roads increases production, decreases maintenance on equipment and gets the job done quicker.

**Indicates pusher loading. In figuring operating costs per cubic yard of material on different length hauls, the operating cost of the pusher unit should be pro-rated and added to the operating cost of each scraper unit. You will find that one pusher can load 3 to 5 scrapers, depending on the length of haul.

LaPLANT-CHOATE
Earthmoving and Land Clearing Equipment



A Word About Tomorrow's LaPlant-Choate Scrapers

With tomorrow's LaPlant-Choate cable scrapers, you'll be able to get full loads faster and easier in all types of soil, including sand. In addition, you can count on greatly reduced weight, lower cable expense — plus a clean, open bowl that's free of overhead obstruction, for greater stability and for easy loading under shovel, drag line, or bin.

Steel Bridge Replaces Span Damaged by Ice

New Structure Completed Over Yellowstone River In Montana; Concreting And Steel Erection

By FRANK B. SARLES,
Western Field Editor

✦ ON March 28, 1943, an unprecedented ice gorge in the Yellowstone River near Fallon, Mont., completely destroyed an old steel bridge by raising the trusses off the piers, carrying them several hundred feet downstream, and then overturning the unrestrained piers. The loss of this bridge, which was built in 1914 to carry U. S. 10 across the river, hampered essential traffic in eastern Montana so seriously that permission was granted for the building of a new steel bridge, and a contract for its construction was awarded October 25, 1943, by the Montana Highway Commission to the W. P. Roscoe Co., Billings, Mont., which took advantage of winter ice as well as the open summer season to complete the job on time.

General Design

The new bridge, with an overall length of 1,142 feet, consists of four through-truss steel spans, each 285 feet long, designed as two 2-span continuous units, with a west abutment, Bent No. 1, three piers, Nos. 2, 3, and 4, and the east abutment, Bent No. 5. The roadway is 26 feet wide with curbs 1 foot 9 inches wide on each side. The three piers and the bents for the open abutments vary in height from 48 to 63 feet and, because of the probability of heavy ice pressure at an elevation only 3 feet below their tops, are designed to resist ice with a crushing strength of 600 pounds per square inch at that elevation. Shale foundation capable of withstanding the maximum design pressure of 7.9 tons per square foot was available at accessible depth under all piers except the west abutment where it was necessary to drive fifty-four 8-inch 36-pound H-beams for foundation piling.

The piers are 4 feet wide and 38 feet 4½ inches long at their tops, with a side batter of 1 in 24, upstream batter of 3 in 12, and downstream batter of 2 in 12. These piers rest on bases 10 feet thick and 63 feet long. Under Piers 2 and 4 the bases are 16 feet wide, and 12 feet wide under Pier 3.

The truss design was based on the use of carbon steel, although silicon steel would have been more economical. Since the latter might have been unobtainable, this substitution expedited fabrication and delivery of the steel for the superstructure.

Foundations

A temporary pile bridge 16 feet wide with an outside walkway of 4 x 12's resting on extended pile caps was constructed on 4-pile bents of 25 to 30-foot piles just upstream from the new bridge. The spans were made 23 feet 9 inches to enable the contractor to use the 18-inch I-beams of the new steel bridge for stringers of the temporary structure.

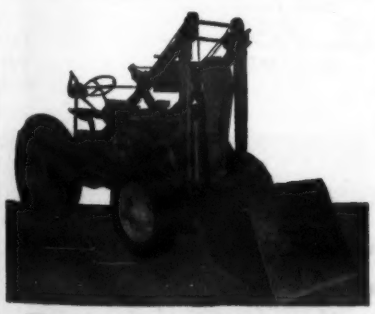
From the temporary bridge a Northwest crane with swinging leads and a 2,400-pound drop hammer drove the 15-inch steel sheet piling 25 feet long to form a cofferdam for the river piers, Nos. 3 and 4, and the 2 x 8 wood sheeting used for Bent No. 1 and Pier No. 2.

The same crane, using a clamshell bucket, excavated about 14 feet of hard-packed sand-clay inside the cofferdam after 6 feet of water had been removed by a 4-inch centrifugal pump. After this had been done once, the pump was used very little. An Ingersoll-Rand pavement breaker and an air spade handled the loosening of the hard-packed material which was so dense that infiltration was negligible.

Public Roads Administration Photo
The east span of the old steel bridge over the Yellowstone River near Fallon, Mont., after its destruction by an unprecedented ice gorge. The black mass seen below the span is blocks of ice.

For the west abutment and pier, Bent No. 1 and Pier No. 2, it was possible to excavate about 12 feet with a dragline before it became necessary to drive the wood sheeting used there, after which

(*Continued on page* 30)



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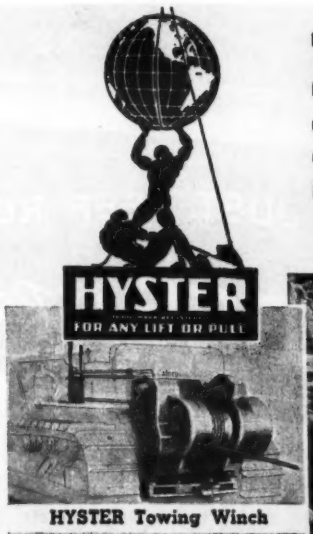
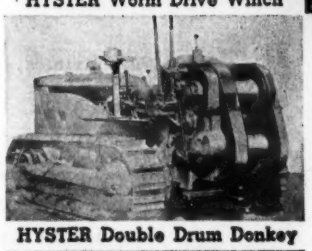


HYSTER Towing Winch

HYSTER Worm Drive Winch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It's used for towing service of every description; for ground log skidding or with HYSTER arches; for use with bulldozer, in levee building, dam construction and general contracting operations. HYSTERS are built especially for "Caterpillar" tractors; a size and type for every model. Consult your "Caterpillar" dealer, or write for information.

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Fill from Boston Harbor For Runway Foundations

(*Continued from page 2*)

authorized the return of the Boston airport to the state, and provided for a $2,000,000 bond issue, of which about $1,026,000 was paid to the City of Boston for improvements made by the City. The balance has been used for expansion of the airport under the direction of the State Department of Public Works. In 1943, the State Legislature authorized a second bond issue, amounting to $4,750,000, for the further extension and development of the airport by the State Department of Public Works through its Division of Waterways, to provide for larger planes and their increased use after the war.

Present and Future Work

Work was started on the initial $1,250,000 contract in February, 1944, and it was completed last month. When this project was visited, the contractor had two dredges, the Nebraska and No. 5, and expected to step up the rate of progress to more than 1,000,000 cubic yards a month. The contractor was paid a unit price for material dredged from the borrow area. The volume of such material was computed by taking soundings of the bottom surface just previous to dredging, and again as soon as practicable after dredging was completed.

A second contract for placing 10,000,000 cubic yards of material for additional runways was recently awarded also to the Gahagan Construction Corp. of New York City for $2,170,000. Work started in November and is scheduled for completion September 1, 1945. The contractor will use both the Nebraska and the No. 5 dredges, which were used on the initial contract, and two additional dredges on this job.

This newly made land is sorely needed at the airport, for the area around the administration building at the western corner of the port is cramped, even for the seventeen daily flights of the American Airlines and Northeast Airlines which are now serving the Boston airport, and with the added traffic expected at the inauguration of services by the Eastern, United and TWA air lines, expansion is imperative.

The Department of Public Works has also acquired land west of the airport along the East Boston flats for a new approach road, sites for hangars, freight buildings, loading platforms, public park, etc. The Boston & Albany railroad tracks now border the airport on the west; the Boston & Maine tracks are fairly close and will be brought in on a new spur line. Far-sighted planning and vigorous initiative are coordinating the inherent advantages that Boston possesses as a rail, water, and highway center to make the city an air center as well. The airport in Boston harbor has a future.

Borrow from Harbor

Eventually four sets of two parallel runways, 7,000 to 10,000 feet long, will weave their pattern in Boston Harbor. The initial contract called for the placing of 5,500,000 cubic yards of hydraulic fill in embankments upon the shallow floor of the harbor to provide foundations for two runways respectively 7,000 and 5,000 feet long x 500 feet wide. A two-fold benefit is obtained by using hydraulic fill. First, there is available in the harbor an adjacent source of desirable borrow material which compacts well into a firm homogeneous mass; second, large areas adjacent to the present ship channel will be dredged to a 40-foot depth below mean low water, which is of benefit to the harbor. The fill is pumped from a borrow area lying southerly from the present airport to the main ship channel, principally from a large area in the vicinity of Governors Island, located at the southern limit of the airport. The harbor bottom is shallow here, with depths ranging from 2 to 17 feet below mean low water. The mean range of tide in Boston harbor is 9½ feet.

The Boston blue clay, which comprises the bulk of the fill, is desirable foundation material. The discharge pipe streams it forth in chunks from 3 to 12 inches in size, rock-like in appearance. It settles and compacts within a reasonable time. Pipe-line crews can work on the fill as soon as placed on account of the nature of the clay lumps. When the clay fill is fully settled and consolidated, dry fill will be placed as subgrade material upon which the surfacing will be constructed. Present observations and soil tests of the clay embankments placed by this hydraulic method indicate that it is suitable as base material, and data are being obtained to determine the type of pavement and subgrade design adaptable to the embankments as built.

Dike from Governors Island

Another source of borrow which eventually will be used in the airport fill is the 129-foot hill on Governors Island, which marks the southern tip of the new

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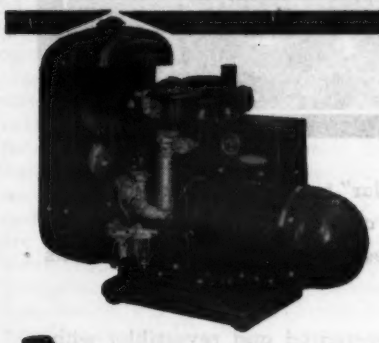

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Models range from 350 to 35,000 watts. A. C. types from 115 to 660 volts; 50, 60, 180 cycles, single or three-phase; 400, 500, and 800-cycle, single-phase; also special frequencies. D. C. types range from 6 to 4000 volts. Dual voltage types available. Write for engineering assistance or detailed literature.

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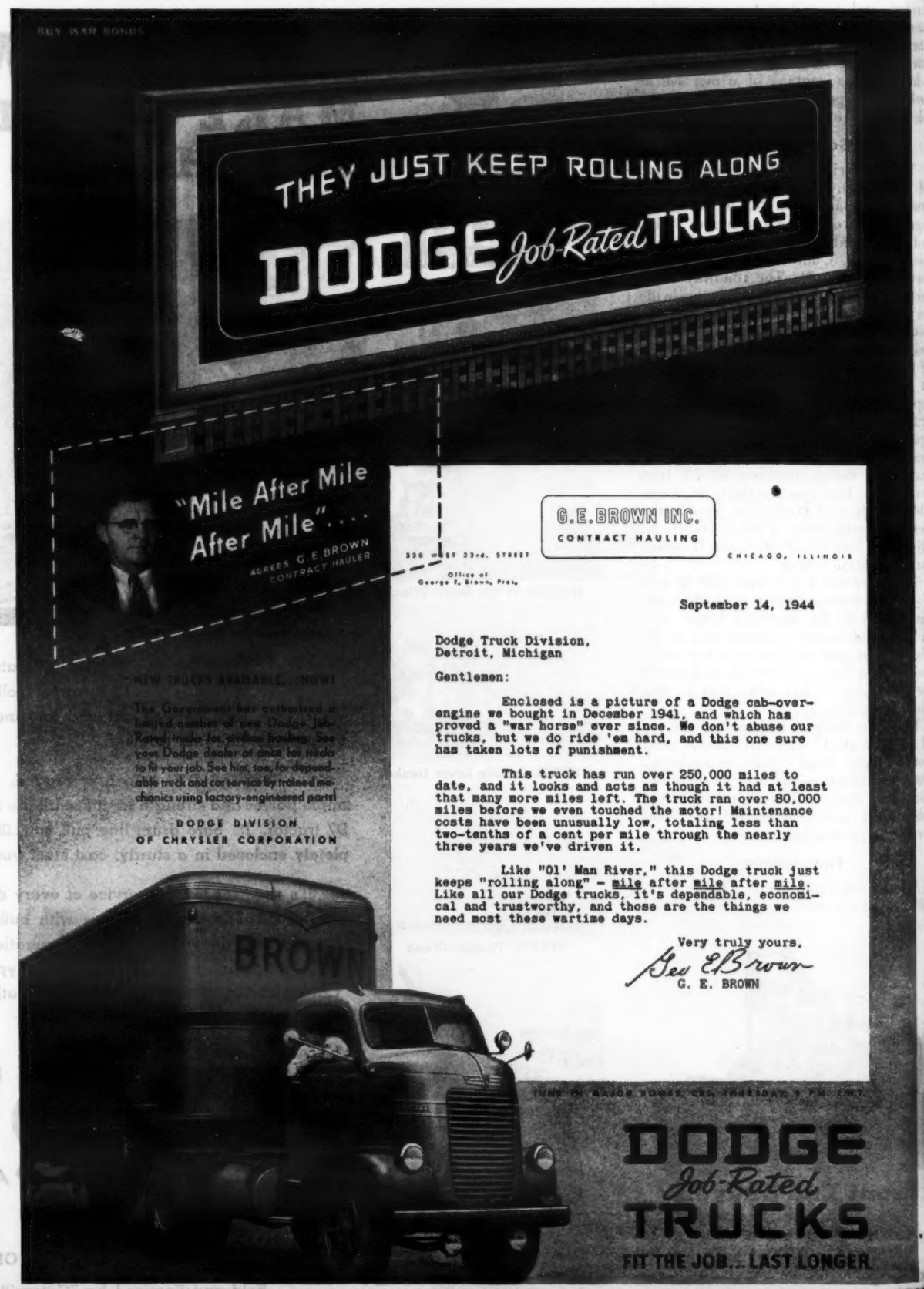

BUY WAR BONDS
THEY JUST KEEP ROLLING ALONG
DODGE Job-Rated TRUCKS
"Mile After Mile After Mile"....
AGREES G. E. BROWN CONTRACT HAULER
NEW TRUCKS AVAILABLE...NOW!
The Government has authorized a limited number of new Dodge Job-Rated trucks for civilian hauling. See your Dodge dealer at once for trucks to fit your job. See him, too, for dependable truck and car service by trained mechanics using factory-engineered parts!
DODGE DIVISION
OF CHRYSLER CORPORATION
G.E.BROWN INC.
CONTRACT HAULING
330 WEST 23rd. STREET
CHICAGO, ILLINOIS
Office of George E. Brown, Pres.
September 14, 1944
Dodge Truck Division,
Detroit, Michigan
Gentlemen:
Enclosed is a picture of a Dodge cab-over-engine we bought in December 1941, and which has proved a "war horse" ever since. We don't abuse our trucks, but we do ride 'em hard, and this one sure has taken lots of punishment.
This truck has run over 250,000 miles to date, and it looks and acts as though it had at least that many more miles left. The truck ran over 80,000 miles before we even touched the motor! Maintenance costs have been unusually low, totaling less than two-tenths of a cent per mile through the nearly three years we've driven it.
Like "Ol' Man River," this Dodge truck just keeps "rolling along" - mile after mile after mile. Like all our Dodge trucks, it's dependable, economical and trustworthy, and those are the things we need most these wartime days.
Very truly yours,
Geo E Brown
G. E. BROWN
BROWN
TUNE IN MAJOR BOWES, CBS, THURSDAY 9 P.M. E.W.T.
DODGE Job-Rated TRUCKS
FIT THE JOB... LAST LONGER
54,000 U. S. COMMUNITIES DEPEND ENTIRELY ON MOTOR VEHICLES FOR TRANSPORTATION AND HAULING

New Boston Airport Under Construction

(*Continued from preceding page*)

runway. This island, 5,000 x 1,000 feet, surmounted by old Fort Winthrop, is composed of a drumlin of glacial deposits designated as till, containing clay, gravel, sand, and a few boulders, which has been baking in Boston harbor for countless centuries. A portion of the hill has been excavated in terraces 10 feet high to provide material for the construction of a 60-foot-wide dike connecting Governors Island with the existing airport ½ mile away, but about 3,000,000 cubic yards of material still remain.

From this island the main north-south 7,000-foot runway is being built, which can be extended to 10,000 feet, if needed, in the direction of East Boston at the north end. Also in the first contract was the northeast-southwest 5,000-foot runway, which can be lengthened to 8,000 feet towards the Winthrop shore when air traffic warrants. Both these runways, as well as all of the proposed runways, are laid out to head for the lowlands between the hills and to avoid obstructions, such as a grain elevator, water towers, chimneys and high buildings in downtown Boston. Clear approaches for 2 miles from the end of the runways are provided, and the runway orientations permit landings and take-offs under all wind directions.

Personnel

The work on the airport, which is known officially as the General Edward Lawrence Logan Airport, East Boston, Mass., is directed by Massachusetts Commissioner of Public Works Herman A. MacDonald and his two Associate Commissioners, George W. Schryver and Robert L. Whipple. Director of Waterways is General Richard K. Hale, with Everett N. Hutchins as District Waterways Engineer. Professor Arthur Casagrande from Harvard and Professor J. R. Markham of the Massachusetts Institute of Technology Department of Aeronautics were consultants. The Gahagan Construction Corp., New York City, is represented by Louis Newburg, Vice President, and O. J. Hussin, General Superintendent.

Mobile Welding Shop Serves S. O. S. Units

A traveling welding shop, installed in the back end of a 2½-ton truck by a Engineer Unit of the Services of Supply, U.S.A., is saving a lot of time and vital material on construction jobs in Britain and France. This unit has many features of interest to contractors who will be on the construction "battlefront" once the war is won.

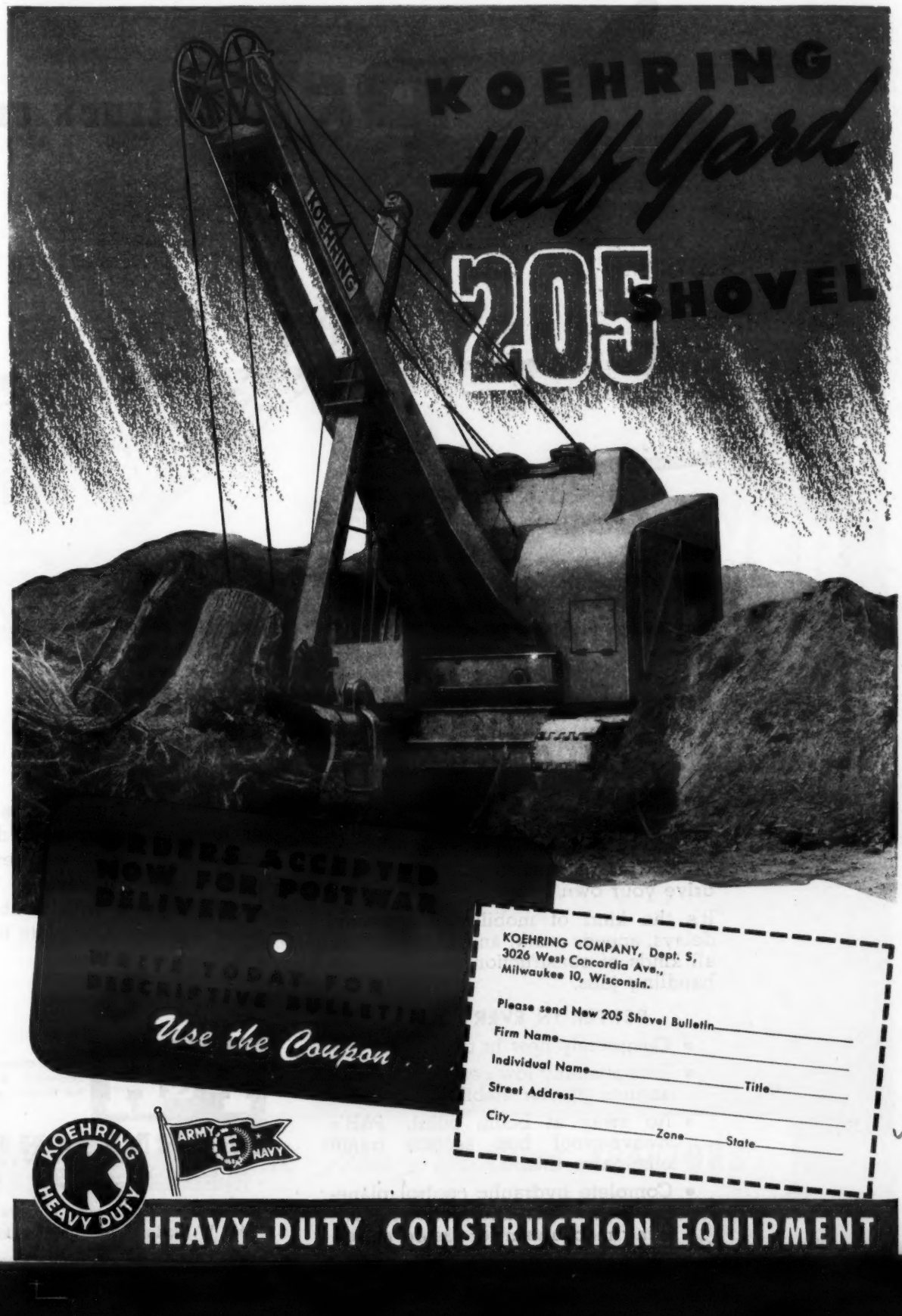
Under the tarpaulin of the S.O.S. truck, welding equipment has been assembled into a unit as compact as a kitchen in a modern apartment house. This equipment includes a Hobart arc welder, acetylene generator, drill press, grinder and welding tables, and steel work benches full of assorted tools. Another welding unit of the trailer type includes a Hobart gas-engine-driven arc welder with auxiliary power generator for operating electric tools and lighting systems for night operation.

A mobile welding shop used by the U. S. Corps of Engineers for field repairs and equipment-maintenance work.

The truck-mounted shop grew out of a need recognized by Lt. Clyde Fritz of Gypsum, Colo. He swapped, borrowed and "promoted" until the collection of equipment was complete. Then he called a couple of Engineers' skilled welders, Sgt. Frank Houhse of Ventura, Calif., and Corp. Bill Haynes of Tulsa, Okla., to assemble the mobile shop. They did the job in less than a week.

Before this mobile welding shop was available, disabled equipment had to be loaded onto a trailer and hauled by a wrecker to a base shop which, in some cases, was 50 to 100 miles away. Thus, delays occasioned by the breakdown of vital machinery have been drastically shortened. The welding shop is never idle, and does everything from helping to make an ice-cream freezer to rebuilding a sprocket for a tractor. One of its specialties is doing "dental" work on the worn buckets and ditch-digger scoops whose big teeth become worn by constant digging into rock-strewn and gravel soil in many parts of England and France.

The war is a long way from over! Even when Germany is defeated, there is a long tough job ahead to finish off the Japs, as the men on Leyte can testify. Support the men at the front by buying more War Bonds at home.



It's easier to lift, lower, push or pull the Simplex Way!
Simplex
LEVER · SCREW · HYDRAULIC
Jacks
for every construction purpose
Awarded the Gold Medal for Safety
Ask for Catalog 44
Templeton, Kenly & Co., Chicago 44, Ill.

American Engineer In Canadian Cabinet

A new portfolio, Minister of Reconstruction, is one of several recently added to the Canadian Federal Cabinet. Honorable C. D. Howe, the newly appointed Minister to this portfolio, also holds the post of Minister of Munitions and Supply, which is probably the largest department in Canada, and he is also closely connected with civil aviation.

Mr. Howe is an American engineer, born in Waltham, Mass., and educated in Boston public schools and the Massachusetts Institute of Technology. He was for a time professor of civil engineering at Dalhousie University in Halifax, but his greatest work has been the remarkable efficiency with which he organized the Department of Munitions and Supply. Americans can understand very well why he was chosen for the responsible position of Minister of Reconstruction to head up the work of post-war construction in the Dominion of Canada.

New Lidgerwood Catalog

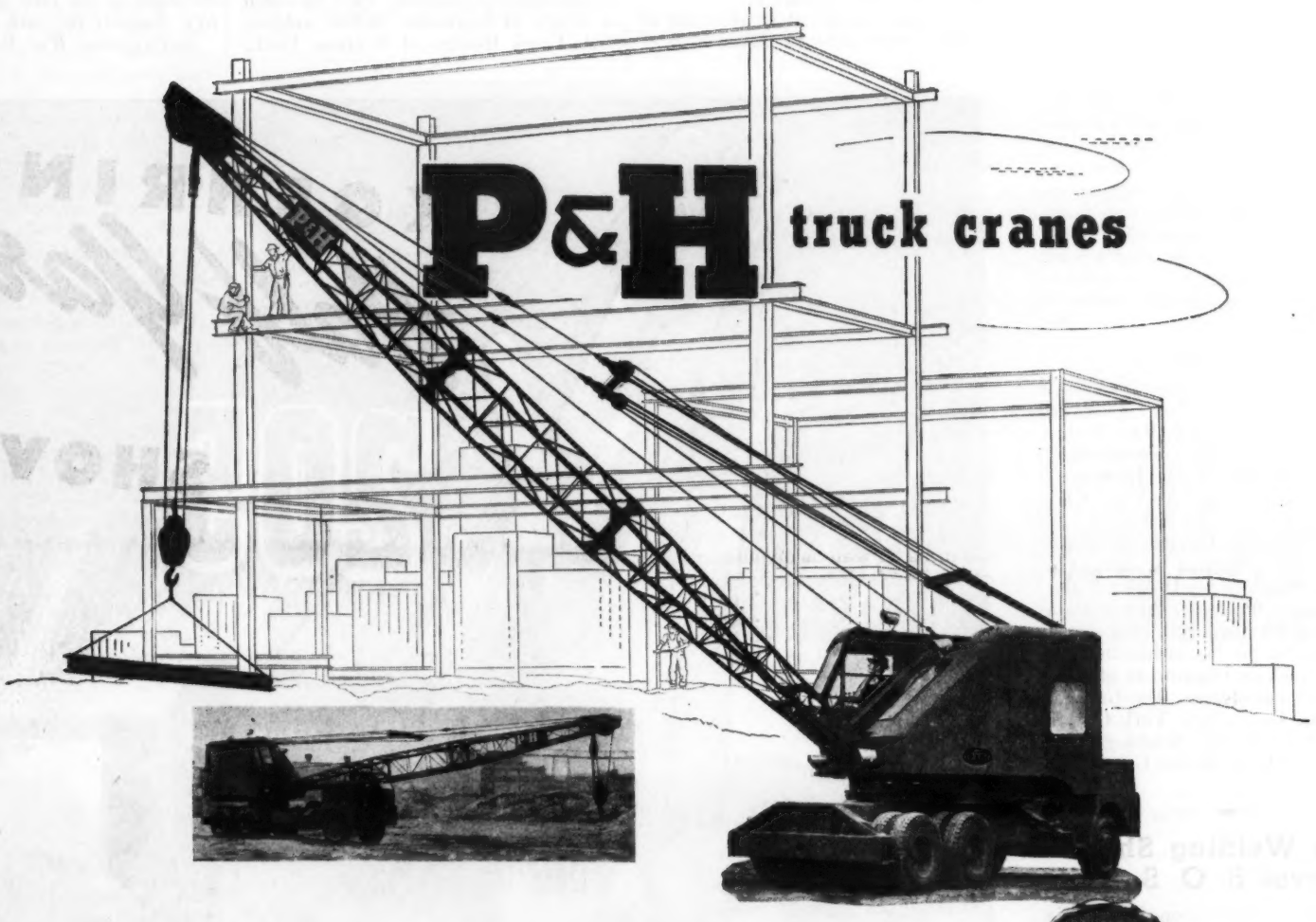
A new and attractive 26-page catalog issued by the Lidgerwood Mfg. Co., 775 Lidgerwood Ave., Elizabeth, N. J., presents pictorially a wide line of hoisting machinery for various applications, including steam, gas and electric-powered hoists for special purposes, as well as construction equipment manufactured by associate companies. Among the many excellent illustrations are several showing cableway set-ups on well known construction projects, and an insert in the catalog depicts the recently acquired Whiting line of stokers.

Copies of Bulletin G-313, together with the insert, may be secured upon application to the manufacturer and mention of CONTRACTORS AND ENGINEERS MONTHLY.

New Structural Company

Clinton Bridge Works, 101 So. Second St., Clinton, Iowa, Gage Structural Steel Co., 3123-41 So. Hoyne Ave., Chicago 8, Ill., and Midland Structural Steel Co., 1300-20 So. 54th Ave., Cicero 50, Ill., have announced their withdrawal from the "4 V" Structural Steel Companies and the formation of Allied Structural Steel Companies, fabricators, engineers and erectors, with a capacity of 75,000 tons annually.

Inquiries may be sent to any of the company offices to receive prompt attention.



GET THERE—AND HANDLE IT
...IN A HURRY!

Wherever the job may be — in congested business areas or out at the edge of town — you can get there with a P&H Truck Crane almost as quickly as you'd drive your own car.

It's the kind of mobility that avoids delays, speeds work, and cuts costs on all kinds of construction and materials handling jobs.

BETTER IN EVERY WAY

- Completely new in design.
- Exceptionally low center of gravity assures greater stability.
- No sway at boom point. P&H's weave-proof box section frame eliminates this.
- Complete hydraulic control planetary boom hoist and planetary lowering mechanism for faster, easier, and safer operation.

The new P&H Truck Cranes assure greater tugging power with double drive axles in tandem — with ten speeds forward and two in reverse. Easier steering is assured with double cam and roller bearing. Complete information is available on request.

P&H HARNISCHFEGER CORPORATION

Electric Cranes • Electric Hoists
Excavators • Welding Positioners
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General Offices:
4419 W. National Ave., Milwaukee 14, Wisconsin

California Highway Repaired by Contract

Aggregates for Base for Three-Course Armor-Coat Surface Produced on Job Along Redwood Highway

✦ SECTIONS of U. S. 101, the Redwood Highway, north from Eureka, Calif., to the Oregon state line were repaired during 1943 and 1944 under contracts awarded to Marshall M. Hanrahan, Redwood City, Calif., by the California Division of Highways. Features of this maintenance project, aimed to keep this highway, which serves a Navy airfield, in condition for the duration, consisted of the production of 40,000 cubic yards of graded base-course material from pit-run gravel excavated from a nearby streambed and crushed and graded by a portable plant, and careful organization to maintain plant production despite a shortage of trucks to haul the gravel to the plant and specification material from the plant to the job.

This road, much of which lies on the western slope of the Coast Range within sight and sound of the Pacific Ocean, offers many construction difficulties. Rainfall, which frequently reaches 100 inches per year, and temperatures which are apt to stay in the 50-degree vicinity throughout the construction season, coupled with typical hill-country grades and alignment, hinder asphaltic operations of any sort and the contractor exercised ingenuity and perseverance to complete the work during the short construction season.

Production of Base Aggregates

From a bar in Redwood Creek near Orick, about 6½ miles north of the 9-mile job, bar-run gravel was loaded by P&H 601, with a 35-foot boom and a Hendrix 1¼-cubic-yard dragline bucket, into a fleet of eight 7-cubic-yard 6-wheel Ford and eight 5-cubic-yard Reo trucks for transportation to a stockpile adjacent to the crushing and screening plant at the north end of the job. A shortage of trucks made it necessary to haul to the stockpile for 10 hours per day although the gravel plant operated for only 8 hours. For a time the shortage was so acute that stockpiling for three days and operating the plant and hauling to the road for two days was tried, but the shortage was gradually overcome by the additional two hours of daily haul to the stockpile which, however, never kept the gravel plant operating to capacity.

From the stockpile of bar-run gravel a Caterpillar D7 tractor with a LeTourneau bulldozer pushed the gravel through a trap onto a 30-inch conveyor belt 50 feet long which carried it to the Austin-Western crushing and screening plant driven by a Buda 150-hp gasoline engine. A 4 x 12-foot double-deck shaker screen acted as a scalper to grade the material, approximately 30 per cent of which was oversize. Material over 2 inches went to the plant's 9 x 40-inch jaw crusher while the 1½ to 2-inch material went to the 18 x 28-inch rolls.

All material passing the 1½-inch screen dropped onto a 30-inch belt conveyor which carried it at right angles into a 12-cubic-yard wooden bin with a single slide gate in the bottom for loading the trucks hauling to the base-laying operations. Approximately 2 per cent of binder material from a nearby clay bank was fed through a second trap onto a 35-foot Austin-Western belt conveyor which discharged onto the belt leading from the screens to the base-gravel bin, its flow being regulated by one man who also picked oversize material and debris from the belt.

Discharge from both crusher and rolls fell onto a 78-foot-long 30-inch-wide conveyor belt which delivered it to the top of a 30-cubic-yard three-compartment wood bin where a double-deck 3 x 12-foot shaker screen, with water supplied by a 4-inch Jaeger centrifugal pump set on the ocean shore nearby, comprised a wet screening plant to separate the crushed material into three sizes, ¾ to ⅜-inch, ⅜-inch to No. 6, and ½-inch to No. 10, and wash it. This material was hauled by truck from the three bins to stockpiles conveniently located along the job for later use in the three-course armor coat. The average daily production of the plant was 750 cubic yards, of which 650 yards was base material and the remainder divided between the three sizes of armor-coat aggregate.

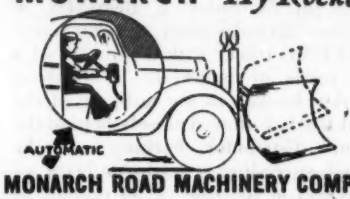
Placing Base Gravel

Hauled from the wood bin at the gravel plant to the road in 5-cubic-yard loads, the base gravel was spread down one side of the old road, a 2½-inch plant-mix top of 50 to 60-penetration asphalt 20 feet wide on a 6 to 9-inch beach-gravel base, which was left undisturbed by this operation. The new material was spread in sufficient quantities to form a base 26 feet wide from shoulder to shoulder of the old road, extending across the old undisturbed surfacing. Enough material for each course was placed in windrows by a spreader box. The windrows, 700 to 800 feet in length, were placed on one side of the road to permit passage of traffic, and then spread to a 4-inch loose thickness by a Caterpillar motor grader while being wet with water delivered in two tanks, one of 1,500 and one of 2,250-gallon capacity, on Sterling trucks. The water was ob-

(*Concluded on page 50*)

SPEED OPERATION *for Snow Plows and Road Machinery with the* . . . .

MONARCH *Hy-Rocket* Power Hydraulic Control

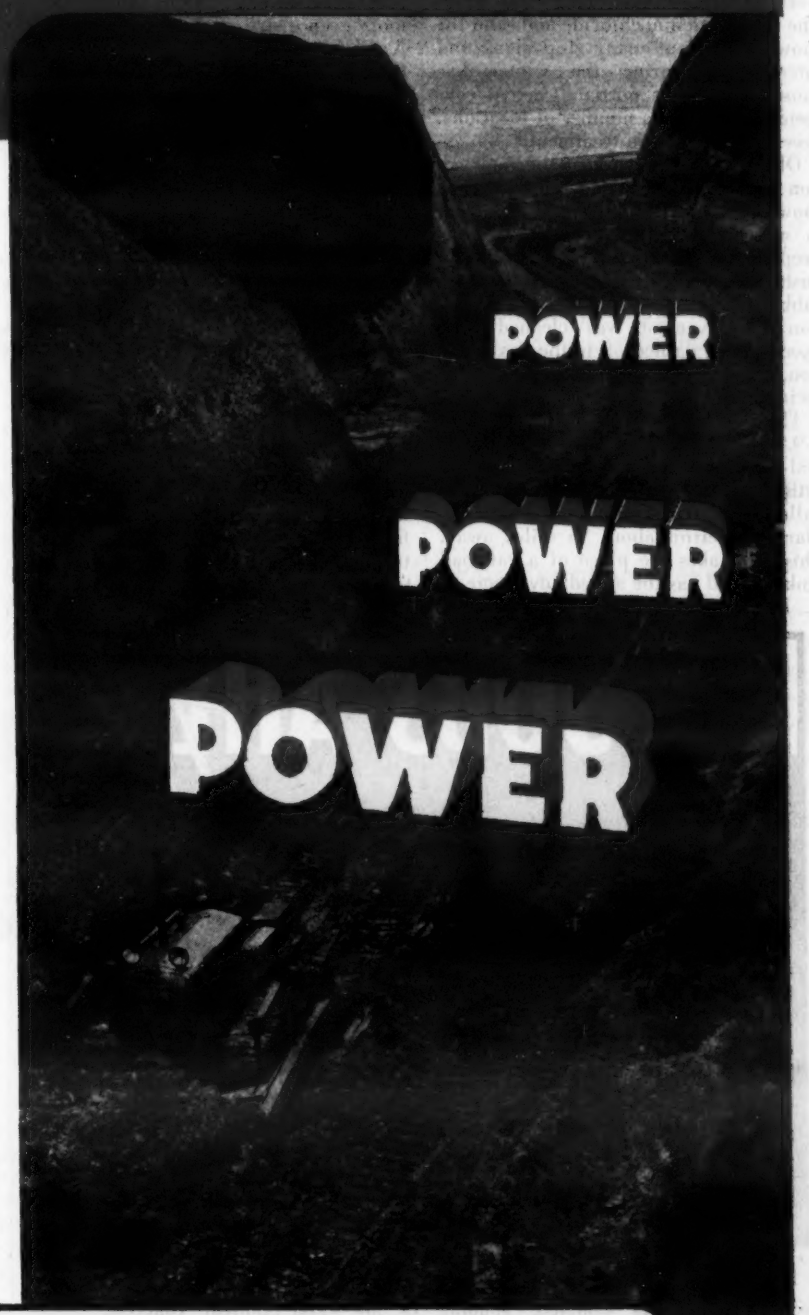


Lifts plows ten times faster than hand pump.
Fan-belt driven by truck engine. Cab-controlled.
Easy installation on new or existing equipment.
Priced for the most conservative budget.

MONARCH ROAD MACHINERY COMPANY, 327-329 Front Ave., N.W., Grand Rapids 4, Michigan

CLETRAC *Tru-Traction* POWER

AT HIGH SPEED ...LOW COST



● For speed, for capacity, for economy, for dependability, your first choice is Cletrac. Cletrac is the *only* tractor with Tru-Traction—controlled differential steering—that keeps both tracks pulling at all times—on the turns as well as on the straightaway. Result—larger loads are handled . . . the tractor always travels smoothly . . . wear and tear are less.

● Cletrac's *balanced design* combines lighter weight with maximum traction. Capacity on grades is increased as much as 19% on a 30% rise. Another reason why Cletracs reduce operating costs.

● Cletrac's *simplicity* makes Cletracs easier to maintain. Steering bands can be adjusted in less than 15 minutes—replaced with a minimum of lost time. Clutch can be adjusted in five minutes and replaced without disturbing engine or transmission.

● As postwar *planning* is converted into peacetime ACTION, the advantages you possess will depend upon equipment—equipment with power, traction and economy. You will profit now by checking all the features of Cletrac which cannot be found in any other tractor.

● A substantial number of Cletracs are being released for essential civilian use—allocated according to government regulations. Your Cletrac dealer will gladly assist you in making application for a new Cletrac if you can qualify as an essential user.

THE CLEVELAND TRACTOR CO.
19300 Euclid Avenue • Cleveland, Ohio

CLETRAC *Tru-Traction* TRACTORS

GASOLINE OR DIESEL

Surfacing, Patching Oakland County Roads

(*Continued from page 9*)

48-V Duplex screening and crushing plant, powered by a Caterpillar 160-hp diesel engine. The jaw crusher is 36 inches wide with a 10-inch opening, while the roll crusher is 40 inches in diameter and 22 inches wide.

Surface Treatment

In the bituminous surface treatment this year 284 miles of either spot or solid sealing were completed. Spot sealing is the treating of small sections of pavement in need of maintenance, without covering the entire area. Solid sealing is treating the entire road surface. In this work, 389,310 gallons of bituminous material were used with 16,222 tons of pea gravel. This pea gravel is generally considered a waste product in the stone crushing plants and can be purchased at a cost 50 per cent less than that for stone chips of the same size. It ranges in size from ⅜-inch down to passing a No. 10 sieve.

All work is done by the county maintenance forces using county equipment. Most of the surface treating is done in the spring or early summer, with some work at intersections being done later. The use of calcium chloride and sand for snow removal at many stop signs and intersections during the winter has caused scaling of portland-cement concrete pavement at a number of locations, necessitating surface treatment.

Observations of work at the intersection of Thirteen Mile and Inkster Roads showed a 15-year-old concrete pavement in a scaly condition being carefully swept by a Detroit Harvester broom pushed by an Allis-Chalmers four-wheel rubber-tired tractor. As fast as one section of pavement was cleaned, this sweeper unit dashed off to the next location, keeping well in advance of the surfacing crew.

The bituminous material, road tar T-9, was delivered to the job by a Federal-Cummins diesel truck and trailer with insulated tanks carrying 5,200 gallons per trip from the Barrett Co. plant in Detroit about 35 miles away. This unit takes the place of a railroad tank car and has the added advantage of mobility, being able to go directly to the job site. The T-9 was hauled by the Scovera Contracting Co. The hot tar was loaded into a county-owned 1,000-gallon pressure distributor mounted on a GMC truck, requiring but 10 minutes. The distributor, which is operated by two men, a driver in front and a man at the control valves in the rear, is equipped with an oil burner which maintains the temperature of the tar at 175 to 225 degrees F. During the summer very little heating is necessary. The T-9 was applied at the rate of 0.3 gallon per square yard. A 10-foot spray bar was used on the 20-foot road, the work being done in two 10-foot strips.

The pea gravel was hauled from the gravel pit of Foley & Beardsley at Clarkston, 20 miles away, by ten county-owned GMC trucks with a capacity of 4 to 5 yards of material. A Buckeye spreader, hooked to the tail-gate of the gravel truck, followed closely behind the pressure distributor, backing over the tar and spreading a uniform layer of pea gravel at the rate of 30 pounds to the square yard. In this manner the tires of the truck did not come in contact with the freshly applied tar. Two men worked on the spreader, seeing that it was kept filled by shoveling the gravel from the truck.

The stone was immediately rolled by a 7-ton 3-wheel Austin-Western roller, to the front of which was attached a 6-foot drag broom which assisted in a more even distribution of the aggregate. A Galion 7-ton 2-wheel tandem roller followed through with a final rolling, after which the road was opened to traffic. Rounding out this equipment was a 1½-ton Chevrolet pick-up truck which carried the gas and oil used by the rollers. A crew of eight men make up this maintenance unit, not counting truck drivers.

Concrete Patching

In Oakland County four units travel about the county in the spring and autumn, filling in cracks and holes in concrete pavements. These units also precede the surface-treatment crews. Each unit consists of a county-owned GMC 5-ton truck which carries three sizes of crushed stone, ⅜, ½, and 1½-inch, and pulls a 750-gallon tank wagon containing T-12 road tar. This tank wagon is filled in the morning from a trailer tank truck, the same as the pressure distributors are charged. Arrangements are made with the tar distributing companies to meet these patching units at specified times and locations. The insulated tank wagon receives the tar at a temperature ranging from 225 to 250 degrees F. The wagons are equipped with kerosene oil burners which boost the temperature of the tar about twice a day.

The stone used in this patching work is collected from stockpiles which are placed in central locations throughout the county. Holes in the concrete which are deeper than 1 inch are first painted with tar and then filled with either the ½-inch or 1½-inch stone, depending on the size of the hole. From a pouring pot T-12 is then poured over the stone, after which the smaller ⅜-inch stone is placed on top to fill in the voids. The surface is then smoothed off with a hand shovel. In patching holes less than 1 inch in depth, T-12 is first poured into the hole after which the hole is filled with ⅜-inch stone and smoothed off with a shovel.

Five men constitute this patching crew: a truck driver; one man pouring tar; one man with a dual wheelbarrow, for greater stability, who supplies the stone; and two men shoveling and smoothing the stone in place.

Goodrich Catalog Section On Rechargeable Battery

The rechargeable wet storage battery for flashlights, recently introduced by The B. F. Goodrich Co., Industrial Products Division, Akron 18, Ohio, is described and illustrated in a 6-page catalog section now available. This section outlines the development of the rechargeable wet storage battery, the principle on which it operates, and gives some interesting comparative figures on operating costs and length of service. One page is devoted to questions and answers about the battery, and the back page tabulates sizes and weights of batteries, chargers, and testers.

Copies of Catalog Section 1230 may be secured upon written request to the company and mention of CONTRACTORS AND ENGINEERS MONTHLY.

. . . for

Low Cost Water

• The "Certified" tag on every Carver Pump is your assurance of top performance on the job. It's the kind of performance that means more water at less cost. Each pump is thoroughly tested so that you will get full capacity right from the start and keep on getting it, on tough jobs or easy ones, with less time out for maintenance and repairs.

Available from 1½" to 10", 5,000 to 200,000 gallons per hour. For details, see your nearby Carver distributor or write direct.

THE CARVER PUMP CO. Muscatine, Iowa

BIG JOBS AHEAD

for YOU... with JACKSON VIBRATORY HAND SCREED!

But before you tackle the big Post-War concrete contracting jobs, get acquainted with the wide scope in concrete surfacing operations offered by the JACKSON SC-4A vibratory hand screed. Its advantages include lightweight, uniform vibration and adaptability to reasonable widths of section. Gives complete pudding to low-water content concrete. Write for further details.

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

Mica Mines Operated By Contractors in N. H.

Construction Equipment Put to Work Digging Vital Mineral from Mountain Tops for War Service

THE days of pioneering are never over if one can judge from the miniature boom which has hit the New Hampshire mica-mining industry. Mica, or isinglass as it is sometimes called, has been declared a strategic material by the War Production Board because of its insulating properties in electrical equipment, and its use in the production of radio tubes, condensers, radar, airplane spark plugs, etc. Prior to the war, we bought most of our mica from the British mines in India for $1 a pound. Because of the war machine's increased demand for mica, not enough could be imported, so the Government has subsidized the revival of this hundred-year-old industry in New Hampshire.

Through its agent, the Colonial Mica Corp. of Newport, N. H., the Government now controls all mica production, buying it for $6 a pound and reselling it to war-product manufacturers for $2 a pound. This subsidy acts as an incentive to prospectors who would not look for mica at the old price. The Colonial Mica Corp. will buy as much mica as it can, and tests made by the National Bureau of Standards indicate that New Hampshire mica meets their exacting specifications.

Since mica mining is chiefly a stripping or quarrying operation, it is only natural that contractors should be attracted to this field if for no other reason than to keep their equipment in service. Road and bridge contractors throughout New Hampshire who have idle equipment are leasing land where mica deposits have been discovered, and paying the owners royalties on the mica that is taken out. Another method is to buy the land outright and sell the owner shares in what is produced.

Mica deposits are detected in rock outcroppings in the wooded hill sections. Tractors and bulldozers are put to work clearing the land. Then a shovel does the heavy stripping for about 20 feet, or to where rock is encountered. Next the drills and compressors prepare the rock for dynamiting and the mining is under way. The shafts follow the mica, and either go down vertically or enter the ground at an angle. Consequently hoisting equipment of some kind is necessary, with buckets on which to load the mica.

Contractors Now Mining

Kenneth Jones, a bridge contractor of Bristol, N. H., is now working three mica mines in the vicinity of Grafton, the Nancy 1, the Nancy 2, and the Charley Davis mines. These mines produce about a ton of mica a week. Equipment is not elaborate but sufficient for the purpose. At the Nancy No. 2, for instance, a Worthington portable compressor furnishes compressed air to drive three Sullivan 57 drills. A Wisconsin VE4 hoisting engine lifts the mica in ½-yard buckets from a vertical shaft by a derrick equipped with a 40-foot boom.

Another contractor busy at mica mining as well as building access roads is Arthur Whitcomb of Keene, N. H., who is working the Nichols mine at Gilsum as well as building access roads to the Fletcher and Valencia mines near Groton. Kenneth Curran, Superintendent for David Nassif Co., a Boston., Mass., contractor, is now prospecting and expects to have a site ready for mica mining. Freedom Mines, Inc. which owns the De Mott, Buckley, and Carpenter mines, has as its President and General Manager William Jabine, former editor of an engineering construction magazine.

Old New Hampshire Mine

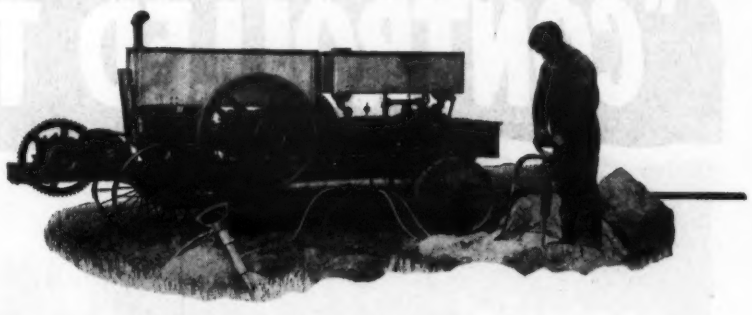
This mining for mica is not a new industry in New Hampshire. First production of Muscovite mica on a commercial scale came from the Ruggles mine in Grafton about 1803. Since then New Hampshire has been one of the leading producers, having an annual output of 416,470 pounds from 1908 through 1939. Of New Hampshire's 131 mica-producing mines, mica is the principal product in only 84, while feldspar predominates in the other 47, with mica a by-product. The latter is the case with the Ruggles mine located at Elev. 1,800 on the top of Glass Hill. After nearly 150 years of operation, this mine not only is one of the state's leading producers of feldspar but also turns out a respectable amount of mica to aid the war effort. In addition to this, the Ruggles mine can boast of an excellent access road to its property, built entirely with its own material and personnel without outside assistance.

C. & E. M. Photo

Loading feldspar and mica into skip buckets for removal from the Ruggles mine at Grafton, N. H.

A huge crater 200 feet across and 60 feet deep has been dug at the Ruggles mine. From the bottom of this hole tunnels are dug into the rock from which other shafts go down into the mountain. The lowest shaft is 100 feet below the

(*Concluded on page* 44)



This horse-drawn Sullivan WK-3 portable air compressor was built in 1910. It was a single cylinder, horizontal unit, powered by a 15 h.p. gasoline engine. Cooling water tanks were placed on top of the unit and the receiver was fixed below. The entire assembly, when mounted on a chassis, weighed 6100 lbs. Capacity 77 C.F.M. (Actual Air).

This Sullivan WK-3 portable compressor was a far cry from its modern counterpart, the Sullivan WK-60 Plus Portable. Yet, as cumbersome as it was, it marked an important development in the construction industry. In pioneering the portable compressor, Sullivan brought dependable, economical air power right to the job.

During the 34 years since the introduction of the WK-3, Sullivan has continually improved its line of portable air compressors. Construction men know that every proved advancement in design and construction is found in Sullivan

THE WORLD'S FIRST PORTABLE AIR COMPRESSOR —BUILT BY SULLIVAN IN 1910

Sullivan WK-70 Zephair—Two-cylinder gasoline powered unit with standard two-wheel mounting. This model weighs 2500 lbs. and has a capacity of 85 C.F.M. (Actual Air). Sullivan portables are available with capacities ranging from 60 C.F.M. to 365 C.F.M.

Plus Portables. Micro-lift valves, anti-friction main bearings, controlled air cooling, super intercooling, forcefeed lubrication and complete accessibility are but a few of the reasons for the economical, dependable performance of Sullivan portables.

The progress Sullivan has made since 1910 will continue, assuring construction men even finer Sullivan portable compressors in the future. Sullivan Machinery Company, Michigan City, Indiana. IN CANADA: Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario.

SULLIVAN

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A helpful guide to speed up cutting off the tops of piles preparatory to capping.

Pile Tops Cut Level With Job-Built Aid

The cutting of pile tops level for capping, in such construction work as ferry docks, wharves, bulkheads, dry docks, and other pile operations, has been made easier by a novel guide for pneumatic saws which have replaced manual cutting on most of this work. Marine and other heavy construction now makes use of pneumatic saws for this type of cutting.

The new guide, which Davey Compressor Co., Kent, Ohio, will manufacture for contractors, but which can easily be made by any one to suit his own specific needs, consists of two lengths of pipe or bar stock secured forward and rearward beneath the pneumatic saw. These act as a guide runner on the battens to insure a uniform level cut within the tolerances of the battens. Cuts can be made to within $\frac{1}{16}$ of an inch in a single operation, thus saving much manpower and time. Because this guide eliminates shimming for the caps and thus promotes sturdier construction, it is particularly adapted to jobs where piles must be cut very accurately to take beams.

The compact tubular design of the Davey pneumatic saw enables it to work between piling spaced as close as 21 inches and allows one-man operation where unusually tight quarters prevail. This compressed-air-operated saw has a built-in oiler, and can work effectively even under water. The standard crosscut blade makes sharpening easy and requires only 30 seconds for replacement.

Readers of CONTRACTORS AND ENGINEERS MONTHLY who would like more details regarding this saw guide should write direct to Davey, mentioning this item, and the detailed information will be sent promptly.

Hill Heads Caterpillar Railroad Power Division

After spending two years as Priorities Supervisor and special traveling representative of the Purchasing Department of the Caterpillar Tractor Co., Peoria, Ill., Lyle E. Hill has returned to the Engine Sales Department as head of the Railroad Power Division. Previous to joining the Caterpillar organization in 1941, Mr. Hill served for nineteen years with the Chicago & North Western Railroad Co., and has a wide experience in the application of diesel-electric railroad motive power.

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Threat to Radio Use By Road Departments

The Federal Communications Commission is now conducting hearings in Washington on the reallocation of radio wave bands which may have considerable effect on the use of two-way radio in the state and county highway fields as well as by highway users. It is reported that applications for the use of radio wave frequencies already outnumber the frequencies available to non-governmental services and fear is being expressed that future development of radio may be handicapped or even halted by the assignment of wave bands to other than law-enforcement, snow-removal and highway-maintenance agencies. State highway officials and police officers are seeking to safeguard their respective present and future use of radio in these fields.

Highway-user interest in the hearings centers on the announcement that they are being conducted for the purpose of "determining the present and future needs of the various classes of non-governmental services for frequencies in the radio spectrum from 10 kilocycles to 30,000,000 kilocycles with the view of ultimately assigning bands of frequencies to such services"; and "encouraging experimentation along such lines as may be justified from the evidence presented at the hearing."

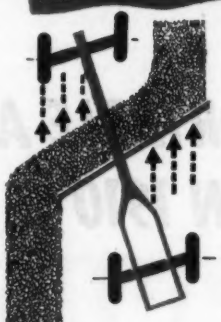
Because of the importance of the reallocation of radio wave bands to the use of radio by state highway departments, a letter describing highway maintenance needs for radio communications was submitted to the Federal Communications Commission by Hal H. Hale, Executive Secretary, American Association of State Highway Officials. This letter pointed out how radio has been used in the direction of men and equipment performing snow removal and ice treatment work, and its importance in emergency road hazards caused by storms, floods, slides, or road surface breaks resulting from traffic, all of which require prompt attention by road maintenance forces to avoid accidents. Attention of the Commission was called to the fact that, while the essentiality of many services, such as those furnished by fire and police departments, power, transit and communications facilities, were referred to in the hearings, there is even a prior essentiality to clear the roads of snow, ice or debris, for the use of emergency crews of such services.

The AASHO statement continued: "The use of radio in the direction of highway maintenance operations was in the development stage at the beginning of the war. Its progress was checked by the various limitations on highway travel. An expanding need for radio communications on the highways is anticipated in the post-war period, with increased traffic, speeds, and the requirements for prompt road repairs to avoid accidents."

It is to be hoped that the radio engineers of the FCC, after reviewing the requests for allocation of radio frequencies submitted at the hearing, will reserve sufficient channels to meet the needs of efficient highway maintenance.

"CONTROLLED TRACTION"

. . . moves more material . . . farther and faster



This "99-M" is using "Controlled Traction" to move the material up the slope; an operation always difficult, and frequently impossible, for ordinary Motor Graders.

This "99-M" is using "Controlled Traction" to move a tremendous windrow of "oil mix" along the entire 13 ft. blade, and miss the windrow with all wheels.

• Getting down to fundamentals, the main job of any self-propelled grader is *to move a satisfactory amount of material with the blade, and at the same time keep moving in the desired direction.*

CONTROLLED TRACTION involves steering the rear wheels, and angling the frame, until the combination of rear wheels pushing behind the toe of the blade, front wheels pulling ahead of the heel of the blade, and blade practically at right angles to the frame in its angled position, *balances the load,* as shown in the diagram, and makes it easy for the "99-M" to move straight ahead with a blade load that would either stall an ordinary Motor Grader, or cause it to slide sideways.

AUSTIN-WESTERN COMPANY
AURORA, ILLINOIS, U. S. A.

BUILDERS OF ROAD MACHINERY
Austin-Western
SINCE 1854

BUY MORE WAR BONDS

Maintenance Program For Bay State Roads

Present Methods of Care Of 1,930 Miles of Highways; Savings in Man-Power by Surface-Treating Earlier

By JAMES E. LAWRENCE, Maintenance Engineer, Massachusetts Department of Public Works

✦ HIGHWAY maintenance on state highways in Massachusetts for 1944-1945 will approximately equal the 1943-1944 program. Below is a tabulation of the budget figures for the two periods:

	July 1, 1943 to June 30, 1944	July 1, 1944 to June 30, 1945
General maintenance	$1,139,520.63	$1,142,944.67
Bridge maintenance and operation	126,999.18	124,957.91
Contract maintenance	11,400.00	16,600.00
Totals	$1,277,919.81	$1,284,502.58

The mileage under maintenance is approximately 1,930 miles.

The Maintenance Department also acts in a supervisory capacity in connection with State Aid to the smaller towns for maintenance, the work being done by the towns. In this connection in 1943 the sum of $1,144,875 was available from the State, against town appropriations of $646,481. In 1944 the sum available from the State is $1,143,750, with town appropriations amounting to $639,970.

Ordinary maintenance of highways has not changed materially, from a standpoint of cost, since the pre-war period. The protection of the original investment in our highways through proper maintenance is being continued to the best of our ability, although alterations of methods and procedures are sometimes necessary due to the shortages of men and critical material.

During the 1943 season, about 1,000,000 gallons of bitumen were used in surface treatments on state highways and about 190,000 gallons in patching. In 1944 it is estimated that about 1,270,000 gallons will be used in surface treatments and about 280,000 gallons in patching.

On the maintenance of town roads in 1943, about 3,300,000 gallons of bitumen were used in surface treatments and about 130,000 gallons in patching. It is estimated that in 1944 about 3,400,000 gallons will be used in surface treatments and about 110,000 gallons in patching.

As may be noted from the budget figures, there is very little contract work either done in the 1943-1944 fiscal year or proposed for 1944-1945. The work consists primarily of minor bridge-repair contracts, such as painting and repairing, as well as retaining-wall construction and tree spraying.

Spring Clean-Up

With the advent of spring, the maintenance crews start their annual spring clean-up. This work consists of surface and shoulder repairs, surface treatments, cleaning and repairing drainage systems and roadsides, and the removal of sand deposited by sand spreaders during the winter months, especially in sections where there is curb. On the older and low-cost types of surface, the continual freezing and thawing action during the winter and the softening of the subgrade during the period when the frost is leaving the ground cause surface breaks, heaves, and settlements which must be smoothed and patched.

The shoulders adjacent to the road must also be taken care of as they become uneven during the winter months. New gravel is added, the shoulder brought to grade, and then is dragged or scraped with a road machine. Guard rail is repaired, new posts inserted, and painting done where necessary.

On concrete roads, cracks which have developed during the winter months are filled with a bituminous filler. Longitudinal and transverse joints, where displacement has taken place, are also filled and, where necessary to prevent progressive raveling when the concrete shows signs of disintegration, the concrete is painted with a bituminous material. In some cases the old concrete is removed and replaced with new concrete. This method, however, is quite expensive.

Correcting Pavement Settlement

When settlements occur in cement-concrete pavements which are otherwise in good condition, it is more economical to jack up the slab to the proper grade than to replace it with a new section. The equipment and labor needed for this work consist of a Mud-Jack, a watering cart, a small truck, operators for the compressor and Mud-Jack, and about five laborers. The Mud-Jack is a large portable motor-operated pump which forces a mixture of loam, cement and water into the subgrade through a hose and nozzle at a pressure of from 350 to 400 pounds per square inch through holes drilled in the concrete.

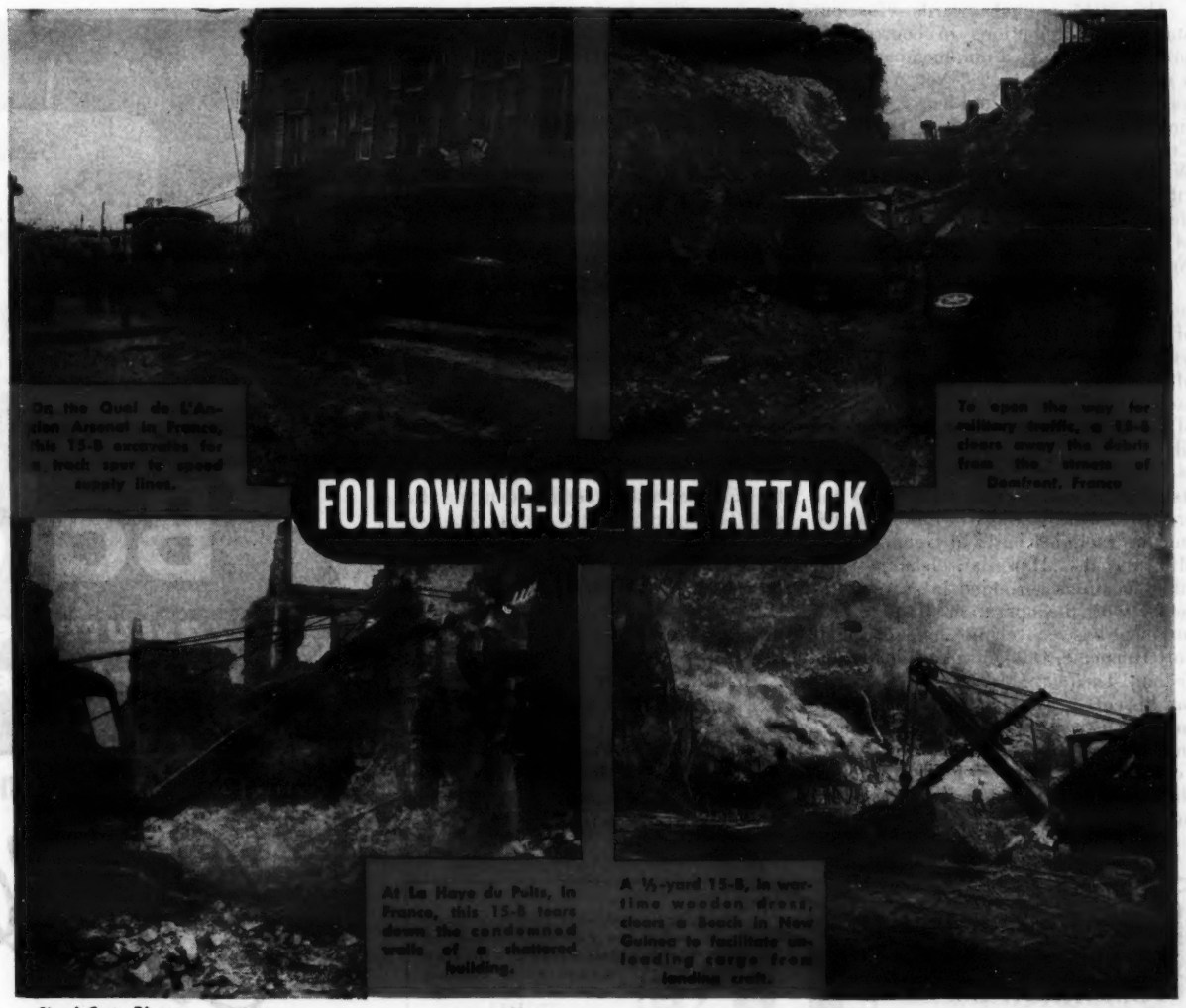
On two-lane roads, two rows of holes 2 inches in diameter are drilled through the concrete, one row spaced 3 feet from the outside edge of the slab and one row 2 feet from the inside edge of the slab. On the inside lanes of roads consisting of three or more lanes, the rows are spaced 2 feet from each edge of the slab, with the holes about 6 feet apart and staggered with the holes opposite.

The mixture of cement, loam and water is forced beneath the slab and the hose is shifted from one hole to another while the slab is gradually raised to the proper grade, the mud and cement eventually providing sufficient stability and strength to hold it there.

Patching

Patching of road surfaces is a process

(*Continued on page 46*)


FOLLOWING-UP THE ATTACK
On the Quai de l'Arsenal in France, this 15-B excavates for a trench spur to speed supply lines.
To open the way for military traffic, a 15-B clears away the debris from the streets of Montfrent, France
At La Haye du Puits, in France, this 15-B tears down the condemned walls of a shattered building.
A ½-yard 15-B, in wartime wooden dress, clears a beach in New Guinea to facilitate unloading cargo from landing craft.

Signal Corps Photos

WHILE battle-front excavators help to put extra sting into the Allied attack, their counterparts behind the lines — in the wake of advancing arms — keep open the routes of supply. To them falls the job of repairing bomb-gouged roads, removing the rubble of blasted ruins, clearing the debris of battle.

By reason of their outstanding performance as well as their number, the Bucyrus-Eries in this work are, as always, conspicuous. Their easy handling, fast action, smooth application of power, and all-around strength again make them output leaders, just as they have been for years — and will be in the reconstruction to come.

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Complete Line of DERRICKS and WINCHES
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Official U. S. Marine Corps Photo
Marine Corps units are well equipped to repair the damages of combat service. This outdoor "service station" is operated somewhere in the South Pacific by a Marine Corps motor transport company.

Construction Awards Of New York's Moles

The 1944 annual awards "for outstanding contributions to construction progress" given to a non-member and to a member of The Moles, New York's organization of tunnel and heavy construction men, are to be given to Francis T. Crowe, constructor of Boulder Dam, and William V. McMenimen, builder of Pacific naval bases. The formal presentation will be made at the dinner meeting of The Moles at the Roosevelt Hotel, New York City, on February 7, 1945.

William V. McMenimen, who will receive the member award in recognition of the executive and construction skill with which he aided in the development of naval air bases throughout the Pacific area, is Chairman of the Executive Board of the group of eight contractors responsible for the huge undertaking, known as Pacific Naval Air Base Contractors. Its construction volume has, up to the present time, exceeded $1,125,000,000 and has included bases at Guam, Wake, Midway, the Hawaiian Islands, and other locations shrouded in secrecy, together with the operation of huge procurement bases covering Chicago, Joliet, Fort Hueneme, Oakland, Alameda, Seattle and Tacoma. Mr. McMenimen began his career as general superintendent on the construction of the McAdoo tubes under the Hudson River between New York and New Jersey for the Hudson & Manhattan Railroad. As Vice President and General Manager of the Raymond Concrete Pile Co., he has, since 1918, had direct supervision over construction aggregating more than $246,774,511, including difficult foundations, borings, dry docks, hydro-electric developments, marine shipways, tunnels, and flood control and conservation. Among his major peacetime undertakings were the Lake Pontchartrain and San Mateo Bridges and the piers for the San Francisco-Oakland Bridge.

To Frank Crowe, non-member award winner, goes credit for the construction of such great dams as Guernsey, Deadwood River, Boulder, Copper Basin, Gene Wash, Parker, and Shasta. As General Superintendent for Six Companies, Inc., he completed Boulder Dam, the world's highest, 726 feet, in five years, which was just two years and two months ahead of schedule. After Boulder came Parker, the deepest concrete dam ever built, with foundations extending 250 feet below the river bed. In 1939 he became General Superintendent for Pacific Constructors, Inc., on the 602-foot-high Shasta Dam, second highest concrete dam ever built. The unique concrete pouring system for this dam involved a 460-foot-high head tower from which seven cableways led to the tail towers.

Mr. Crowe began his engineering career with the U. S. Bureau of Reclamation for which he worked on several noted dams, including Jackson Lake, Arrowrock, and McDonald Lake. As first assistant to the superintendent of construction on Arrowrock, which was for 20 years the world's highest dam, he designed a comprehensive concrete conveying and distributing system, as well as a then unique pipe system for the pneumatic transportation of cement. He is an honorary member of the American Society of Civil Engineers.

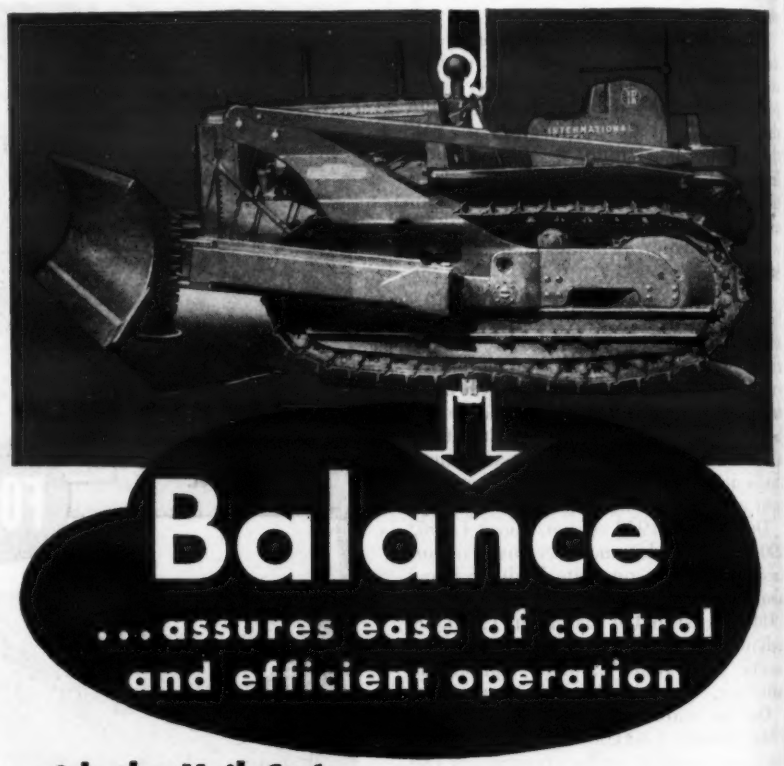
26th Annual Report On Illinois Highways

The Twenty-Sixth Annual Report of the Division of Highways, Department of Public Works and Buildings of the State of Illinois, has recently been released. This 281-page volume is a very complete report on the 1943 activities of this state department under twelve different heads, including administration, legislation, organization, financing, design, contracts awarded, construction, materials and tests, maintenance, highway research, machinery, and county roads and city streets.

The problems of post-war design and revisions in design policies are discussed at length, with two pages devoted to typical cross sections of different types of pavements in use during 1943.

The section on materials and tests describes the endeavors of the Bureau of Materials to meet the conditions brought about by the war so as to maintain a high standard of inspection with a reduced personnel. The vast problems of the Bureau of Maintenance, due to war conditions and the spring floods of 1943, are discussed at length, with numerous illustrations of damaged shoulders and pavements, as well as bridges.

Twenty-three pages are devoted to the work of the Bureau of Highway Research which was carried on to collect, analyze, and release statistical data relating to the administration, financing, and improvement of Illinois highways and streets. The more important activities of that year included the continuance of traffic studies, a special truck survey, and a study of the industrial and occupational characteristics of Illinois passenger-car owners made at the request of Federal authorities.



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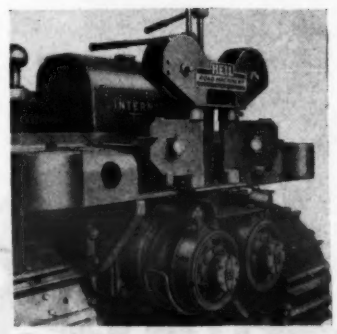
Cable Dozers

for International Harvester TracTracTors



Equipped with simple, fast-operating, troublefree Heil Cable Power Control Unit

Ample safety factor. Smooth-operating brake and clutch assemblies that eliminate shocks and jerks. Large drums that run cool. Sheaves designed to reduce wear on cables.

The full power of your tractor drives on the blade — moving more "pay dirt" with each load — and there is no nosing down or rearing up, because the center of gravity has not been changed by the addition of the Cable Dozer. This is just one example of the thorough engineering which has accomplished perfect teamwork all along the line. Note operator's unobstructed view — convenience of controls (adjustable to his reach) — rugged side member construction. Send for bulletin describing many other features which assure you of cleaner, faster dirt moving at lower cost. R-19

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Air-like speeds of post-war automobiles demand increased protective measures in building more and better highways. TUTHILL combines this added safety with low cost of installation and upkeep.

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Edward H. Connor, 80-year-old Vice President of the Missouri Valley Bridge & Iron Co., has supervised the construction of many of the large bridges in the United States.

A Bridge Builder Looks at Future

A Well Known "Old-Timer" Discusses Post-War Trends In Steel Bridges, Heavier Design, Greater Safety

✦ DURING the past year there has been a great deal written and a great deal said about post-war planning, conversion to peacetime production, what we shall do after the war, and how we shall do it. Edward H. Connor, 80-year-old Vice President of the Missouri Valley Bridge & Iron Co., Leavenworth, Kansas, pointed out in a recent interview that, while all of this discussion has been interesting and some of it helpful, we have now reached the period we have been talking about. Some war contracts have been cancelled, and a few factories which have been producing war materials around the clock are already changing over to making tools and equipment for farm needs, replacement parts for heavy machinery, and a limited number of items for civilian use.

"Here at the Missouri Valley Bridge & Iron Co.," Mr. Connor said, "when our last contract has been fulfilled, we shall change from building landing barges for the Navy to building bridges for whoever wants bridges built."

Mr. Connor, who in 1942 left semi-retirement to rejoin the Missouri Valley Bridge & Iron Co., has had a long and comprehensive experience in bridge design and construction. When his recent election to honorary life membership in the American Society of Civil Engineers was announced, he was credited with being the country's leading authority on caisson design, construction, and sinking.

Born at Alton, Ill., in September, 1864, Edward Connor attended Washington University, St. Louis, graduating in 1887 with a degree in Civil Engineering. For the next two years he was assistant engineer on the $3,000,000 Illinois Central RR bridge over the Ohio River at Cairo, Ill. During 1889-90 he was shop inspector for George S. Morison, followed by two years as bridge engineer for the Erie Railroad. He became assistant engineer with E. L. Corthell in Chicago and New York during 1892-94, and for the Union Bridge Co. at various times from 1893 to 1896. In the latter year, Mr. Connor was appointed resident engineer for the Chicago Rock Island & Pacific Railroad on the Mississippi River Bridge at Rock Island, Ill., and engaged in consulting work, with offices in St. Louis, during 1897-98.

In 1899 Mr. Connor became associated with the Missouri Valley Bridge & Iron Co., successively as assistant engineer, Vice President and Chief Engineer, and Consulting Engineer, remaining with this firm until his semi-retirement in 1937. During this period he designed and erected many of the large bridges in the country, and was Managing Engineer for the contractors on the East Bay section of the San Francisco Bay Bridge where the deepest caissons in the world were used.

Heavier Loads—Heavier Bridges

In answer to the question "Will post-war specifications call for a different type of bridge than the conventional design prior to 1941?", Mr. Connor replied, "I do not think so, but in the next ten years, we shall see a trend toward heavier designs. This will be true for both highway and railroad bridges. It is a natural trend. Heavier trucks and tractors, heavier equipment of all kinds, demand heavier bridge design. Our experience with moving the heavier war equipment has shown us that equally heavy peacetime equipment will require this change in design."

Mr. Connor believes that more emphasis will be placed on welding than before the war, and that there will be more welded structures for highways. He expressed a doubt, however, that railroad-bridge specifications would depart

(*Concluded on page 69*)

WINPOWER ELECTRIC PLANTS

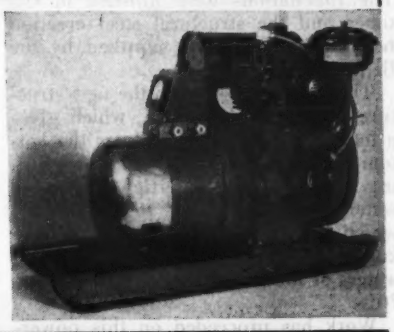
Designed To Do The Job!
Built To Do It Right!

Model WP 2A

2KW, 110 Volts, 60 Cycle, AC

- Sturdily built—
- Air-cooled Wisconsin Engine—
- Portable—only weighs 265 lbs.
- Compact—30" long, 20" wide, 24" high.

Other sizes from 350 Watts to 35,000 Watts, both AC and DC



WIND POWER MFG. CO., NEWTON, IOWA

TYPICAL DIESEL LUBRICATION PROBLEMS:

5. Liner Wear

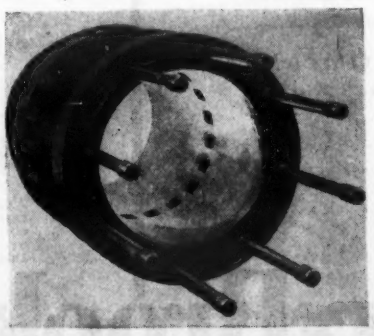
Wear on Diesel liners is commonly concentrated in the high-temperature belt near the combustion chamber. This is largely attributable to the inherent inability of most lubricating oils to "wet" hot metal surfaces.

Unlike spark ignition engines in which a partial vacuum in the combustion space during the intake stroke assists in drawing oil toward the upper compression rings, Diesels operate at or above atmospheric pressure in the combustion space which tends to drive oil away from the rings.

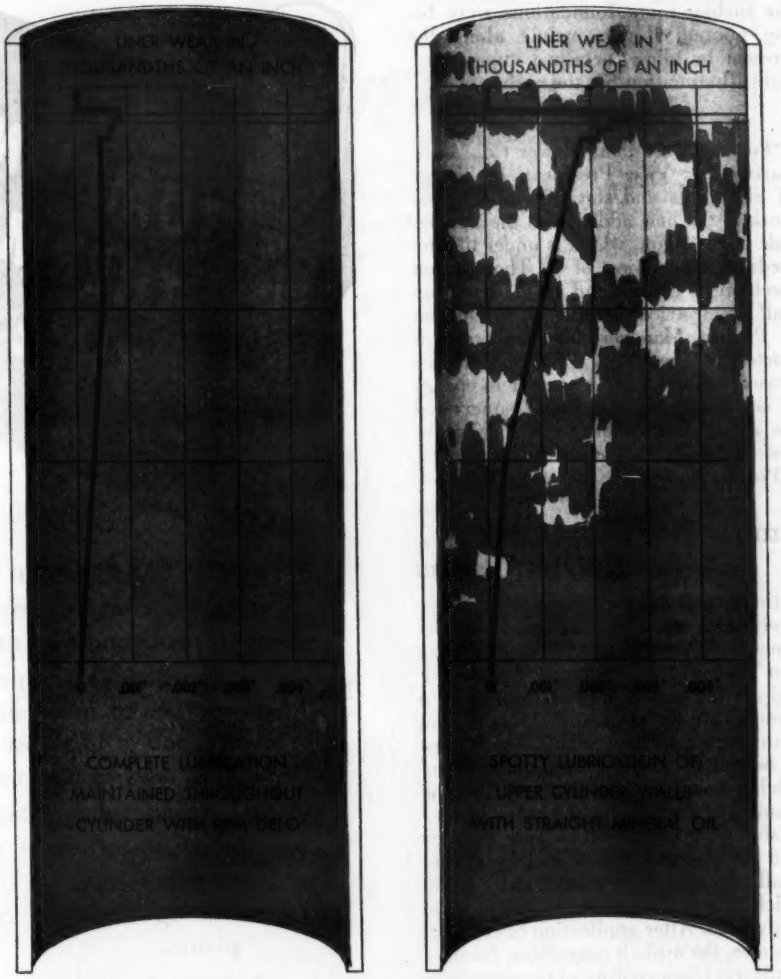
It is imperative then—to prevent relatively dry operation in the top piston ring high-temperature area—for the lubricant to have high-temperature adhesion characteristics.

To achieve this high adhesion factor under all operating conditions in RPM DELO Diesel Engine Lubricating Oil, a special compounding material was added. With this additive, RPM DELO will not run away from hot surfaces, thus preventing metal-to-metal contact on hot-running engine parts.

A typical example of the effectiveness of RPM DELO in preventing liner wear is offered by the Chicago, Rock Island and Pacific Railroad. One of its "Rocket" Diesel powered locomotives ran 157,076 miles on RPM DELO without an oil change, with liner wear of only .001 in.



Liner from Rock Island "Rocket" engine showing wear of only .001 in. after 157,076 miles on RPM DELO without an oil change.


LINER WEAR IN THOUSANDTHS OF AN INCH
COMPLETE LUBRICATION MAINTAINED THROUGHOUT CYLINDER WITH RPM DELO
SPOTTY LUBRICATION OF UPPER CYLINDER WALLS WITH STRAIGHT MINERAL OIL

These charts of one of the tests required by the Army in certifying oil for use in combat equipment, graphically illustrate (right) marked increase of liner wear in upper cylinder zone due to inability of straight mineral oil to provide full lubrication of this high-temperature area; and (left) reduction of liner wear by ability of RPM DELO to stick to these hot spots.

Other causes of liner wear minimized by RPM DELO include:

1. Corrosion caused by carbonic and other acids at low temperatures.
2. Scuffing of liners from rocking of piston rings in worn grooves.
3. Scoring and scratching of liners due to stuck piston rings.

Reducing liner wear to a remarkable degree is but one of RPM DELO'S advantages in solving Diesel engine maintenance problems. Its other properties include: The ability of RPM DELO to eliminate ring sticking, to stop excessive deposits on rings and ports, and to prevent bearing corrosion.

RPM DELO has world-wide distribution and is marketed under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial RPM DELO (concentrate). Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity.

RPM DELO

Write on your letterhead for free booklet on RPM DELO, *Standard of California, Dept. T-12, San Francisco, California*

STANDARD OF CALIFORNIA

Power Plant Extension Built Near Pittsburgh

(*Continued from page* 15)

August 14 and a high pour of 460 yards of concrete was obtained in one day. The foundations were finished in October and the structural steel erection began. Steel is being supplied by the Bethlehem Steel Co.

The top of the steel in the new structure will go to Elev. 895, which gives a total height of 175 feet from the bottom of the foundation at 720. The building will be made watertight by using waterproof cement up to Elev. 763, which is 2 feet higher than the highest known flood in 1936 which raised the waters of the Allegheny 27 feet to Elev. 761.

Work has proceeded on this powerplant construction both day and night, employing about 300 men. The work was organized so that excavation for the boiler room could progress while the turbine-room foundations were being poured. Lights strung along the present building furnished almost daylight illumination for the night crew.

Personnel

For the West Penn Power Co., A. N. Cartwright, Vice President in charge of all plants and stations, is directing work at the new addition to the Springdale power plant, which is under the immediate supervision of T. Thorsten on mechanical details and H. A. P. Langstaff on electrical details. C. A. Duncan is Project Manager for Sanderson & Porter, of New York City, and R. Lee Fraser is Chief Field Engineer in charge of construction. Bert Pretty supervised the installation of the Griffin wellpoint system, which was rented by Sanderson & Porter.

Emulsified Asphalt In Road Operations

Emulsified asphalts are used extensively for highway and road maintenance, resurfacing, and for the construction of new road surfaces. An emulsified asphalt is a high-grade asphalt in a form which, for most work, is more convenient than paving asphalt, which must be heated to be used, or a cut-back involving gasoline, kerosene, or fuel oil. Emulsified asphalt has the color of chocolate and is composed of pure bitumen held in suspension in water by a very small amount of emulsifying agent which makes the asphalt more fluid and easily used. After application to road aggregates, the asphalt coagulates, forming a uniform black coating of the same pure adhesive asphalt which was emulsified.

Emulsified asphalt may be used with local aggregates, equipment, and labor and is applied cold at atmospheric temperature. It may be used for a light resurfacing for an old pavement by applying the emulsified asphalt and then covering it with stone, sand or gravel chips. For base stabilization, emulsified asphalt is mixed with the materials already present in the road bed to create a strong waterproof foundation for a new wearing surface. In plant-mix or pre-mix, the combination of aggregates of proper gradation may be proportioned in a mixer with the required amount of emulsified asphalt and the batch mixed until all particles are thoroughly coated. This pre-mix is then hauled to the job, placed on the road at the desired thickness, and after a short curing period is compacted by a roller. It is also possible to use emulsified asphalt as a road-mix where an unusually large area is to be covered, and the aggregate available is adapted to mixing with traveling road equipment. The aggregate and emulsified asphalt are mixed by a multiple-blade motor grader or a traveling plant and then spread to the desired cross section and rolled until compacted. Penetration macadam pavements may be laid with emulsified asphalt applied by means of a pressure distributor.

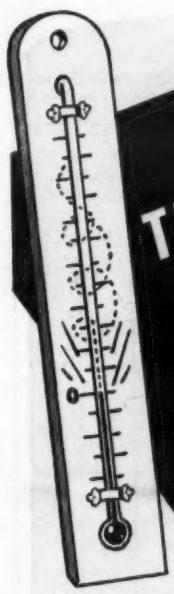
Bitucote Products Co., 1411 Central Industrial Drive, St. Louis, Mo., has prepared a 16-page illustrated booklet which describes various construction operations with emulsified asphalt and gives some of the reasons why its use is increasing rapidly. This booklet, "Bitucote—The Modern Bituminous Coating", will be sent to readers of CONTRACTORS AND ENGINEERS MONTHLY who write direct to the producer and mention this news item.

The large-size truck-tire shortage for both civilian and military use continues critical, according to the B. F. Goodrich Rubber News Letter. Although the tire industry has produced in 1944 twice as many truck and airplane tires as in the best peacetime year, the increase in requirements has been at a greater rate than the increase in production.

You can't work with prima donnas . . . .

A welding and cutting outfit which fails in an emergency is too great a luxury to own. Sure, VICTOR costs a little more to buy...but it costs so much less to own.

VICTOR EQUIPMENT CO.
844 FOLSOM STREET
SAN FRANCISCO 7, CALIFORNIA



TUMBLING THERMOMETER TIME IS HERE!

A partial check-list of Cleaver-Brooks equipment for cold weather construction and maintenance!

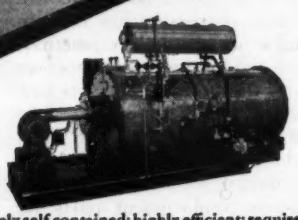
DESPITE cold and wet weather, construction and maintenance work must go on.

Cleaver-Brooks equipment provides steam, heat or hot water — fast, efficiently and at low cost — for a wide range of cold weather needs, such as—

- heating asphalt, road oils, bituminous materials in tank cars and storage tanks.
- heating water for central mixing plants.
- thawing and heating aggregate in stock piles or bins — for winter concreting.
- steam for cleaning machinery, thawing frozen ground, operating steam hammers, heating buildings and offices, and other uses.

Write for bulletins and complete information on the entire line of Cleaver-Brooks equipment for cold weather construction and maintenance.

CLEAVER-BROOKS COMPANY
5110 North 33rd Street • Milwaukee 9, Wisconsin



AUTOMATIC STEAM PLANTS

Completely self contained; highly efficient; require only simple piping connections to place in operation. Fully automatic fuel-oil burner; condensate recovery and feed water pumping system; no stack needed, sizes ranging from 20 to 500 h. p.; pressures 15 to 200 lbs.

HOT WATER BOOSTERS

Oil-fired; fully automatic or manual operation; no licensed engineer needed to operate; two capacity sizes: 3000 gals. storage tank providing 1600 gals. of water heated 150° F. per hour; 1500 gals. storage tank providing 800 gals. of water heated 150° F. per hour.

PORTABLE PUMPING BOOSTERS

Heats bituminous material by direct firing in one operation, loading directly to distributor, relay truck or returning to tank car. Built in two sizes, truck mounting or 4-wheel trailer.

PORTABLE TANK-CAR HEATERS

Available in 2 and 3 tank-car sizes. Oil-fired with exclusive four-pass flue travel; dry-coil steam condensate return under pressure — no water or heat loss. An all-purpose unit—provides a portable source of steam wherever needed.

Cleaver-Brooks PIONEERS AND ORIGINATORS OF

TANK CAR HEATERS . . . BITUMINOUS BOOSTERS . . . AUTOMATIC STEAM PLANTS

C. & E. M. Photo
Vitrified-clay pipe is laid by hand in a narrow trench for the new sanitary sewer in Salina, N. Y.

A New Sewer System Built in Salina, N. Y.

Syracuse Contractor Excavates Sand And Hardpan and Lays 6 to 12-Inch Pipe in Trenches up to 16 Feet Deep

✦ THE Mattydale section of the town of Salina, a suburb of Syracuse, N. Y., and located immediately to the north of it on U. S. 11, has a recently completed 7-mile system of sanitary sewers which will fill a long-felt want of this community. Sewage was formerly handled by septic tanks, cesspools, the old-fashioned privy, and in some cases even by open ditch drainage. Sewage flowing through the new system will be delivered to the Onondaga County sewage works where it will be chemically treated.

Trench Excavation

Work was started on July 1, 1944, by the contractor, M. A. Bongiovanni of Syracuse, who personally directed the work. The pipe was laid from 4 to 16 feet below the ground surface, with most of the trenches between 8 and 12 feet in depth. The trenches were dug 3 feet wide by two Parsons trenchers, a Model 40 and a Model 310. Also on the job for excavating trenches was a Northwest 25 ¾-yard Pullshovel. The excavation for the ninety manholes on the job was done by a Northwest No. 2 with a ½-yard clamshell bucket. The soil was a mixture of clay, sand, sandy loam, and a good proportion of hardpan. The hardpan was broken out with Ingersoll-Rand pneumatic spades operated by an Ingersoll-Rand 210-cubic-foot air compressor. To keep the trenches free of ground and surface water, two Jaeger 3-inch, two Novo 3-inch, one Carver 3-inch, and one Humdinger 3-inch pumps were used.

Spud braces consisting of 2 x 8-inch planks, one on each side of the trench, were placed on an average of 4 to 6 feet apart to prevent caving of the sides of the trenches. The planks were braced by two sets of twin-screw Simplex jacks, 2 inches in diameter, placed at about the one-third points of the depth of the trench.

Before the pipe was placed on poor bearing soil, a layer of gravel was laid as a foundation course. The thickness of this layer varied from a minimum of 3 inches to a maximum of 2 feet.

The sewer line in most cases was laid about 8 feet off the center line of the street, but this distance varies depending upon the location of the gas and water mains. The streets of Mattydale are unpaved so no pavement had to be disturbed by the excavation.

Sizes and Kinds of Pipe

The sizes and kinds of pipe in this 7-mile system are:

Kind	Size	Linear Feet
Vitrified-clay	6-inch	17,000
Vitrified-clay	8-inch	18,000
Vitrified-clay	10-inch	500
Transite, cement-asbestos	12-inch	1,800
		37,300

The 6-inch lines were used for house laterals, while the 8 and 10-inch lines were used for street mains. The 12-inch Transite pipe is the main outlet sewer for the greater part of the system and discharges into the 4-foot Ley Creek sanitary trunk sewer which leads to the sewage treatment plant. This takes care of the eastern or greater half of the system. The topography of the ground causes the sewage from a small section in the western end of Mattydale to flow westward to the existing 21-inch Bear Trap Creek sewer which also discharges into the Ley Creek trunk sewer.

Laying the Pipe

The vitrified-clay bell-and-spigot pipe was supplied in 2 and 3-foot lengths. When working with the 2-foot sections,

(*Concluded on page 39*)

Light in a Hurry — Where You Need it — When You Need It

CLARK PORTABLE LIGHT PLANT

Use it when *other* light sources fail.

Use it when *more* light is needed.

Use it also to power small tools —electric drills, sanders, etc.

The CLARK PORTABLE LIGHT PLANT can be taken quickly to any location and supply immediately 500 watts of electricity. No batteries to recharge—no acids to spill.

And—it throws a beam so powerful that it is possible to read a newspaper *a block away!*

WRITE FOR CIRCULAR

CLARK SUPPLY COMPANY 245 E. Keefe Ave., Milwaukee 12, Wis.

"the light that's always ready" — "as handy as a pocket in a shirt"

HERE'S WORK for Your outfit . . .

ON CONSTRUCTION

ON LOGGING

ON MINING

▲ THIS BY MINERS

▲ THIS BY LOGGERS

HERE'S HELP on Equipment and Manpower . .

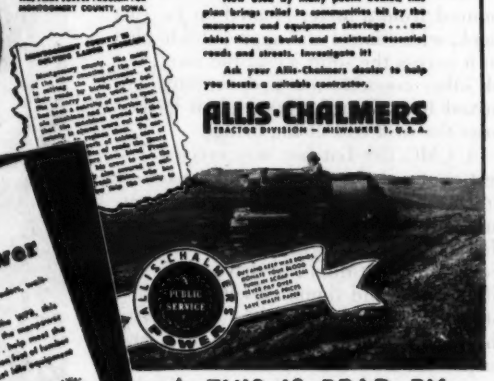
Contract your Road Construction, Maintenance and Snow Plowing

Avail yourself of contractor's men and machines. If you aren't already doing so . . . contract with construction companies to handle your road building, maintenance and snow plowing. Here is a valuable source of manpower — construction companies with experienced crews. Here is a reliable source of machine power — tractors, scrapers, bulldozers, graders — waiting to be put to work.

Now used by many public bodies, this plan brings relief to communities hit by the manpower and equipment shortage . . . enables them to build and maintain essential roads and streets. Investigate it!

Ask your Allis-Chalmers dealer to help you locate a suitable contractor.

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.



▲ THIS IS READ BY HIGHWAY OFFICIALS

PAVING THE WAY

Appearing in magazines reaching the proper fields . . . these ads will help keep your organization busy.

If you have equipment and manpower at your disposal . . . why not contract with highway officials, loggers and miners to handle their work? Many are in desperate need of help! Your assistance will contribute greatly to the war effort . . . at the same time you will keep your crew intact. To assist in bringing you together, the above series of advertisements is appearing urging the use of the contract system in various fields. Let your Allis-Chalmers dealer serve as your contact man.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Bridge Substructure Built During Winter

(*Continued from page 17*)

the clamshell completed the excavation. No water troubles were encountered in these two units. Because of the unforeseen depth at which hard shale could be reached at Bent No. 1, the west abutment, it was considered advisable to set this pier on piling, so fifty-four 8-inch 36-pound H-beams were driven by the same crane and drop hammer used for other pile-driving operations on the job. An unusual excavation item was a 3-foot vein of coal encountered at various elevations at the different piers.

The original temporary bridge was utilized for the concrete delivery for Pier 3. Aggregates for the concrete for Bent 5, the east abutment, were hauled in trucks across the solidly frozen river but before the work on Pier 4, the easterly river pier, had been started the spring break-up made the loss of the temporary structure inevitable, so the wood floor, I-beam stringers, and some of the bent bracing were removed. When the temporary bridge was rebuilt as far as Pier 4 later in the spring, a float of ten wooden barrels, five on each side yoked by 6 x 8's running longitudinally with the four 6 x 8's cross-connected to form a working platform, was utilized by the workmen setting the bent braces.

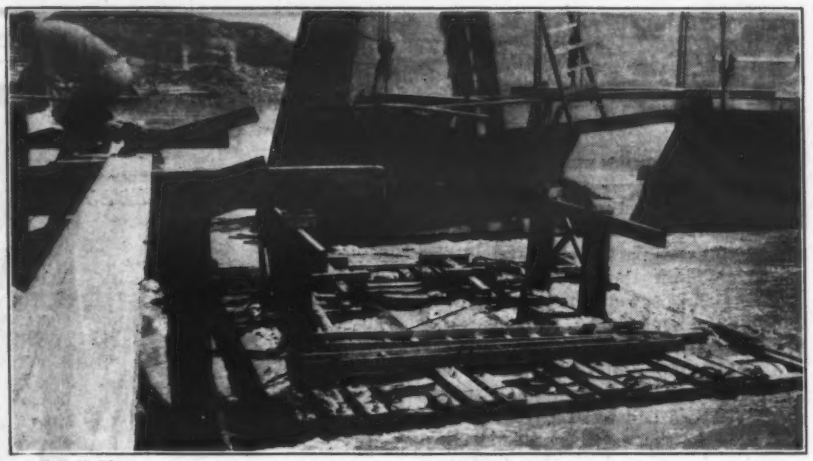
Concrete

Bent No. 5, the east abutment, was poured from a mixer located on the east bank, with cement and aggregates hauled to it across the solid ice in the river, but all other concrete was proportioned and mixed in a central mixing plant located near the west end of the bridge.

A CMC Bin-Batcher was erected 100 feet south of the west end of the bridge and a wide timber and earth ramp permitted trucks hauling aggregates from the local plant of Sidney T. Olson & Sons, Billings, Mont., to drive to the top of the bins and dump directly into any of the three compartments. Parallel to the longer axis of the 30-ton bins and suspended under the gates of the three compartments, a steel beam provided a track for a ½-cubic-yard bottom-dump batcher equipped with 3-beam scales which was used to weigh the two aggregates. The bucket was then rolled to either end of the beam for discharge into the skips of two Koehring 10-S mixers, one at each end of the plant.

Water from the river was pumped into a 500-gallon tank set between the mixers in front of the bins and the mixers' built-in pumps transferred it to their batching tanks. A 30-hp vertical boiler set near the concrete plant, with 2-inch lines leading from it to the aggregate bins, stockpiles of excess materials, and water tank, heated these materials for cold-weather concreting.

A roofing-paper-covered house beside the concrete plant provided storage for cement, shipped from the Trident plant of the Three Forks Portland Cement Co., which was truck-hauled from the railroad at Fallon to the job by the contractor. Two sacks of cement per batch were placed in the mixer skips by two men.



C. & E. M. Photo

When setting braces on the bents of the temporary bridge across the Yellowstone River, for use during construction of the new steel structure, workmen used this platform supported by floating barrels.

Immediately in front of the two mixers was a depressed driveway, walled by timber bulkheads and spanned by timbers supporting two bottom-dump steel hoppers into which the mixers discharged. Steel-bodied dump trucks, driving through the depressed passage, were loaded from the steel storage hoppers whose sliding bottom gates remained closed for the storage of several mixed batches pending the return of the trucks used for hauling the concrete.

A concrete batch for the substructure consisted of the following:

Cement	188 lbs.
Fine aggregate (Passing No. 4 screen)	352 lbs.
Coarse aggregate (No. 4 to 1½-inch)	808 lbs.
Water	110 lbs.

Mixing time was 1½ minutes and the slump averaged 2 inches. Six batches were ordinarily hauled in each truck load over the temporary bridge and dumped by gravity into a steel hopper close to the pour. The same Northwest crane used for other operations handled a 1-cubic-yard bottom-dump bucket, loaded by gravity from the hopper, to deliver the concrete to the pier forms. The average production from this plant ranged between 15 and 18 cubic yards per hour. A Lister-Blackstone light plant was used when heavy pours necessitated night operations.

(*Concluded on page 72*)

Complete line of
gasoline, pneumatic and electric driven concrete vibrators and grinders
Write for information and prices
ROETH VIBRATOR COMPANY
1737 Farragut Ave. Chicago, Ill.

U. S. Marine Corps Photo

EQUALLY expert with bulldozer or bazooka, road roller or rifle, the Seabees have proved themselves the seventh wonder of the construction world. At this remote Pacific outpost, they rush a road through to the site where a dock will be built.

Just as important as the efficient Seabees in the successful building of vital bases is the efficient operation of their construction equipment. And whether on a tropical Pacific island or right here at home, efficient operation in large measure depends on effective lubrication—Texaco.

Texaco Alcaid, Algol or *Ursa Oils* in air compressors, for example, assure wide-opening, tight-closing valves, free piston rings, open ports, clear lines, continuous air supply. They also assure maximum service life between overhauls, fewer repairs and replacements. Their use is world-wide.

Texaco lubricants have proved so effective in service they are definitely preferred in many fields, a few of which are listed at the right.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, 135 East 42nd St., New York 17, N.Y.

THEY PREFER TEXACO

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

TEXACO

TEXACO Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON SUNDAY NIGHTS ★ METROPOLITAN OPERA BROADCASTS SATURDAY AFTERNOONS

Two Wickwire Divisions Move to Worcester, Mass.

The General Sales Offices of the Springs and Formed Wire Division and the Automotive Division of the Wickwire Spencer Steel Co. are now located at New Bond St., Worcester, Mass. The Morgan plant, which manufactures products for these divisions, is also located near that city and the relocation of the sales offices is for the purpose of better coordinating sales and manufacturing activities.

A District Sales Office will be continued at 500 Fifth Ave., New York 18, N. Y. Products of these divisions include compression, extension, torsion and flat precision springs, and valve, clutch and other types of springs used in the automotive industry.

Portable Electric Plants

Onan electric generating plants are described in two illustrated folders which have recently been issued by D. W. Onan & Sons, 1225 Royalston Ave., Minneapolis 5, Minn. These plants are available in 65 models of 350 to 35,000-watt capacity, in ac types from 110 to 660 volts, 50, 60, 180-cycle, single or three-phase, and 400, 500 and 800-cycle, single phase, and dc types from 6 to 4,000 volts. Combination ac-dc output models are also available. Onan plants are suitable for stationary, mobile or emergency service, to furnish electricity wherever commercial power is not obtainable, providing current for lighting, battery charging, operation of portable electric tools, fire fighting, and many other services on construction projects and in highway shops.

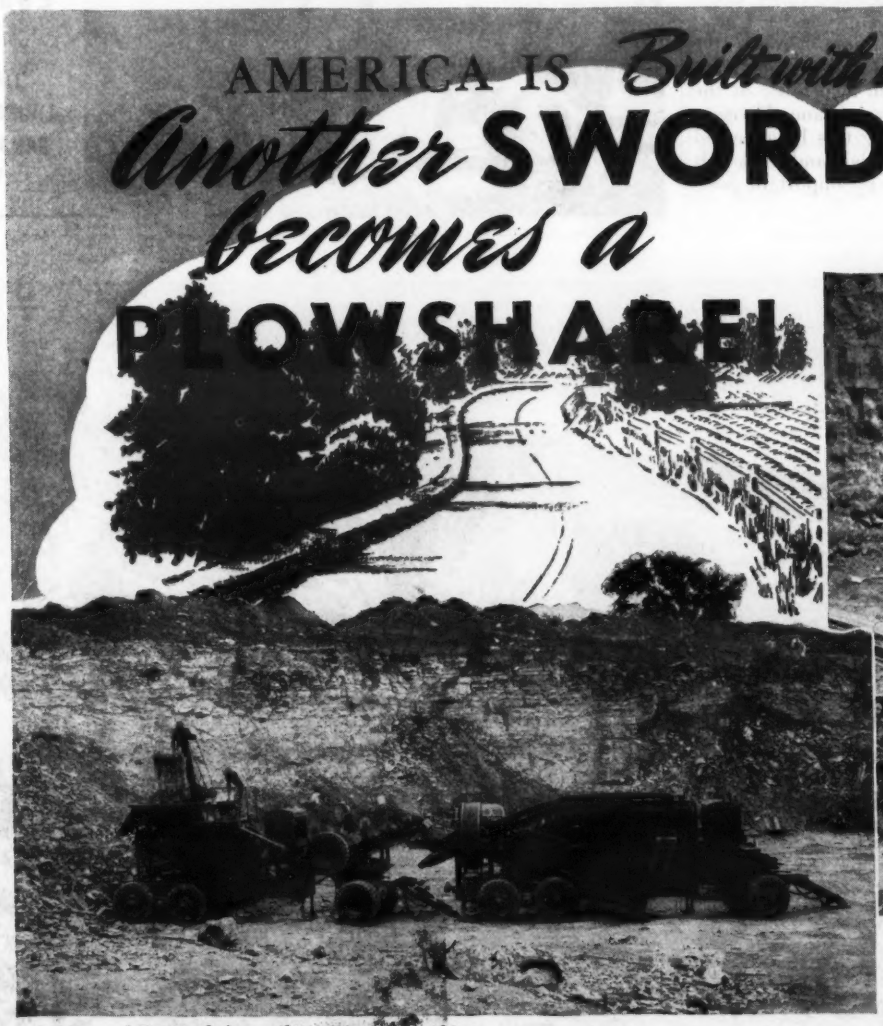
These booklets give detailed information about these Onan plants. Interested contractors and engineers may secure copies by writing direct to the company.

Carney Companies Name General Sales Manager

N. A. Holmer has been appointed General Sales Manager of the Carney Cement Co. and the Carney Rockwool Co., with headquarters in St. Paul, Minn., where the sales staff will now be located. Quarries and plants are in Mankato, Minn. Mr. Holmer was formerly Director of Sales and Marketing for the Elastic Stop Nut Corp., Newark, N. J., and his previous connections include the Mid-State Steel & Wire Co., of Crawfordsville, Ind., and the Unity Mills Distributing Co.

AMERICA IS *Built with Aggregate!*

Another SWORD *becomes a* PLOWSHARE!



Designed for military service, this type of Cedarapids crushing and screening plant will easily handle your toughest aggregate producing problems.

This Cedarapids mobile plant was on duty in a French quarry five days after D-day. Signal Corps Photo

Cedarapids Built by IOWA

THE IOWA LINE

of Material Handling Equipment Includes

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS—STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS — TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

From building military airports and highways that are vital to victory to producing aggregates for peacetime airports, highways, dams, and other construction projects, is the next step for these Cedarapids portable crushing plants.

We're still building them for the Army and Navy but soon all the experience and facilities which produced these plants on schedule can be turned almost entirely to building them for you. They will turn out better products for less money, keeping you in that wonderful competitive position that you have always had with Cedarapids equipment.

Whether you are figuring on a single unit or a complete plant, you'll be way ahead if you get it from Iowa, headquarters for aggregate producing and crushing equipment, and asphalt plants. See your local Iowa dealer today.

IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA

The Hystevator is a self-loading attachment for cleaning roadside ditches and similar jobs.

New Cleaning Device For Roadside Ditches

Designed for cleaning ditches along roads and highways, as well as for many small dirt-moving jobs in construction and maintenance, the new Hystevator, recently announced by the Hyster Co., Portland 8, Ore., and Peoria, Ill., is a self-loading attachment for use with any standard dump truck. Traveling on the shoulder of a roadside or irrigation ditch, the truck draws the scraper along until the latter is filled, then as the truck backs up the scraper is raised and the contents dumped into the truck.

Further details on the features and uses of the Hystevator, which the manufacturer states is also suited for many loading operations when the scraper is replaced with a loading hook, may be secured by interested contractors and state and county highway engineers by writing direct to the company at 2902 N. E. Clackamas St., Portland 8, Ore., or 1800 No. Adams St., Peoria 1, Ill.

An American Crusher Captured in France?

On page 10 of the October issue of CONTRACTORS AND ENGINEERS MONTHLY appeared an article on the way U. S. Army Engineers used to good advantage materials and equipment left behind by the Germans at Cherbourg. A large rock crusher found in one of the quarries was depicted on page 88.

This plant turns out to be a Cedarapids crushing and screening plant made by the Iowa Mfg. Co., Cedar Rapids, Ia., which has supplied a thousand or more of these plants to our armed forces.

According to the Publications Branch, Bureau of Public Relations, War Department, this machine was "found in a quarry and taken over by the advancing American troops", which would indicate that in some way the Germans had got hold of an American-made machine. If so, it was one of the few good things they did not take away with them or destroy in their desperate stand at Cherbourg.

However, Kenneth Lindsay, Vice President and Sales Manager of the Iowa Mfg. Co., reports that it is virtually an impossibility that this plant could have been in German hands, since it is of a type made solely for the use of U. S. Army Engineers, the British Army, and the Chinese Army. By a very slim chance, it might have been captured by the Germans in Sicily or Italy, but Mr. Lindsay doubts it. In any case, the plant did yeoman service in aiding our Engineers to put the port of Cherbourg into service for the Allies.

Industrial Locomotives

Although construction projects at the present time are not of the magnitude to warrant the use of industrial locomotives for the handling of materials, many contractors are thinking ahead to the large projects which will be developed immediately after the war and are making their plans for hauling equipment.

Vulcan industrial locomotives of various types are described and illustrated in Bulletin No. A-394 which has recently been issued by Vulcan Iron Works, Wilkes-Barre, Pa. These include saddle and side-tank locomotives, tender-type locomotives, and diesel and gasoline locomotives with either geared or electric drive.

Copies of this bulletin may be secured by writing direct to the manufacturer.

Link-Belt Speeder Names Allen New Chief Engineer

It has been announced that Harold F. Allen has been appointed Chief Engineer for the Link-Belt Speeder Corp., and will divide his time between the Chicago and Cedar Rapids plants.

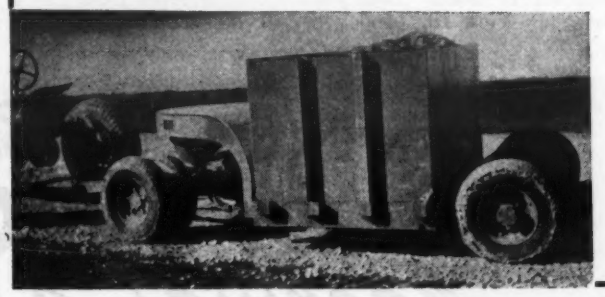
Mr. Allen has been a member of the Link-Belt Locomotive Crane Division since 1916 and during this long period of service with Link-Belt and Link-Belt Speeder has held many important positions.

For More Uniform Compaction at Less Operating Expense—

INGRAM PNEUMATIC-TIRED ROLLERS

Oscillating axles—to insure uniform compaction
Short turning radius
Electric welding throughout
Low center of gravity—to prevent upsetting
Easily pulled by any medium-sized tractor
Ground pressure 60 to 350 pounds per inch of tire width

WRITE FOR LITERATURE



J. E. INGRAM EQUIPMENT CO.
1146 WEST LAUREL STREET
SAN ANTONIO 6, TEXAS

It takes a TOUGH Air Compressor for jobs like this!

In tough construction jobs, where compressed air is needed and the going is rough, use a Schramm Air Compressor.

Ruggedness of construction—yet light in weight—is a big feature of the Schramm Compressor . . . a feature that enables you to easily move it about, going into even rough-and-tumble places—and all the while furnishing as much compressed air as you want!

Schramm Compressors—both stationary and portable—are completely water-cooled—compact—sturdy! For *any* compressed air job use a Schramm. Detailed information is in our illustrated Bulletin EC-44, yours for the asking.

SCHRAMM INC
THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Channel Stabilizers In Los Angeles River

Derrick-Stone Core Walls Placed by Crane, with Concrete Cover, Protect Bed of Problem River

(*Photos on pages* 1 *and* 84)

✦ THE Los Angeles River, which in its turbulent career has caused much worry and large expenditures to control or correct its rampages, was further controlled during the spring of 1944 by the construction of twelve new stabilizers, scattered along 10 miles of the river's lined channel, and repairs to existing structures to reduce channel erosion. The contract for this work was awarded to Guy F. Atkinson Co., San Francisco, Calif., by the Los Angeles District Office of the U. S. Engineers.

The existing channel lining, of concrete or grouted riprap, lies on a 3 to 1 slope with a level bench 12 feet wide at river-bottom elevation and a cut-off toe on the same 3 to 1 slope continued 8 feet below the channel grade. The new stabilizers were placed at right angles to the lining and extend across the channel, their tops level with the flat section of the channel lining at the grade of the channel bottom. With a top width of 8 feet and a bottom width of 33 feet, they average 10 feet in depth and vary from 169 to 275 feet in length. Their cores consist of heavy derrick stone while the exteriors are covered with a 3-foot-thick concrete coat. Additional derrick stone was placed in a semi-circle on the downstream side of each stabilizer, starting from a point on the center line of the channel and 25 feet from the stabilizer and extending to points 75 feet downstream and 15 feet in from the channel lining on each side.

Diversion and Excavation

The moderate dry-weather flow of the river was diverted to one side and then to the other of the ample channel to permit uninterrupted construction. In most locations this could be done by a Caterpillar RD7 tractor and LeTourneau bulldozer pushing the loose sandy material of the river bottom to one side to form a dike parallel to the channel lining, but in certain locations this work was done by either a Lorain 77 or a Northwest crane with a McCaffrey 1½-cubic-yard dragline bucket.

With the river flow diverted to the opposite side of the channel, excavation of a trench 10 feet deep and 38 to 40 feet wide was started on the dry side. The Lorain and Northwest cranes were used for this work and the excavated material was cast to stockpiles to form a dike upstream from the excavation.

Derrick Stone

Granite blocks weighing from 500 to 6,000 pounds, with at least 50 per cent weighing more than 2,000 pounds, were shipped by rail from a commercial quarry near Riverside, Calif., to a siding convenient to the work. At the time the project was visited, the unloading spur was only a mile away but it was not always possible to obtain so short a haul.

At the unloading point, an extremely skillful operator of a Northwest crane, with a specially built heavy-duty McCaffrey clamshell bucket controlled by a McCaffrey-Ruddock Rud-o-Matic tagline, unloaded the derrick stone to either the stockpile or the four 8-cubic-yard dump trucks, three Macks and one GMC, which hauled the stone. Using the 12-foot level section of channel lining at the foot of the slope for a haul road, these trucks delivered the derrick stone to stockpiles near the point of construction, where a Caterpillar D8 and LeTourneau bulldozer assisted in placing the stone in a position from which they could be reached by a second Northwest crane with a 60-foot boom and a second McCaffrey heavy-duty clamshell bucket and Rud-o-Matic tagline. The operator of this crane skillfully placed the large stone in proper position to form the core wall of each stabilizer and filled the voids

(*Concluded on page* 71)

U. S. Engineers Photo

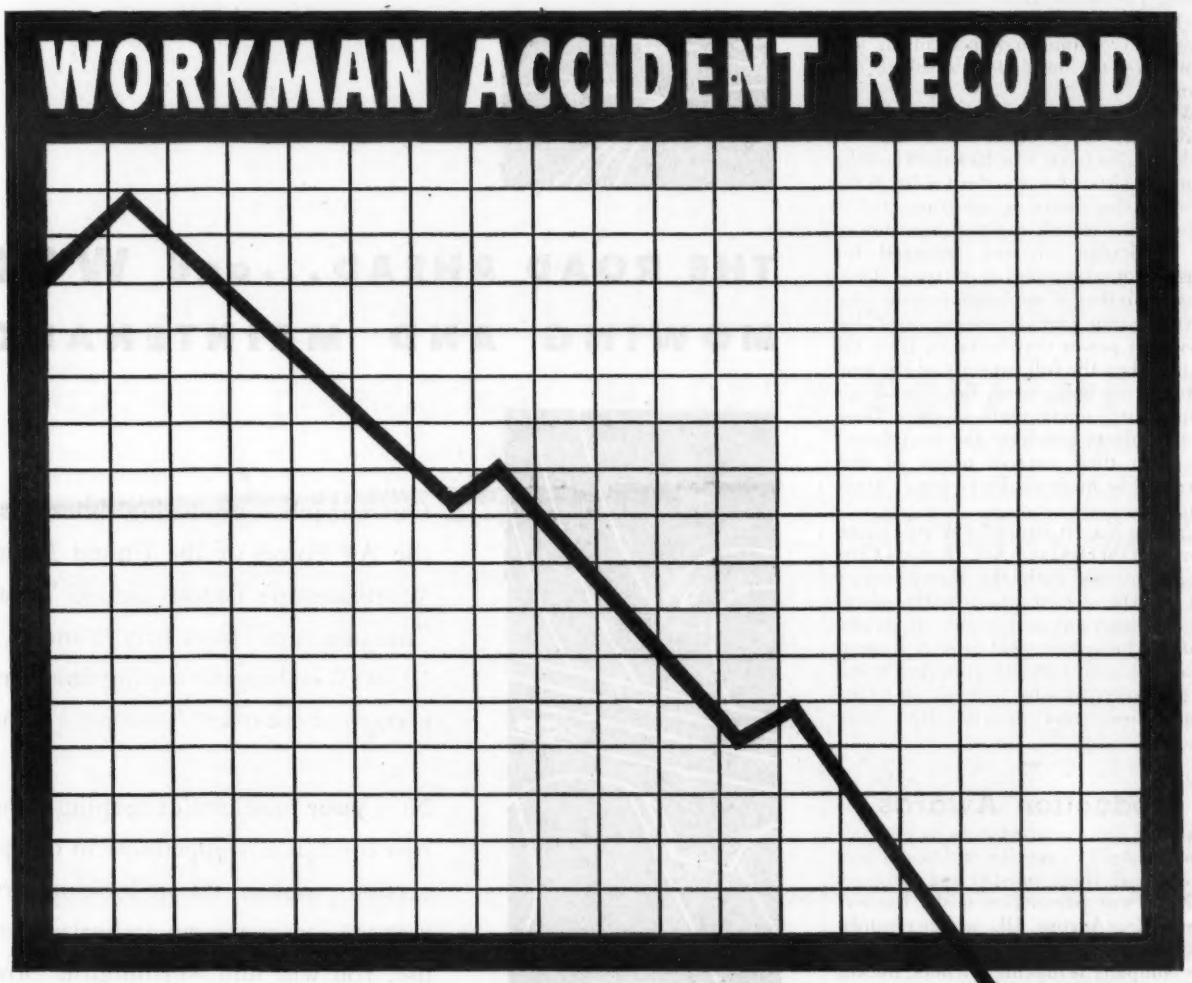
Building the core wall of a channel stabilizer in the Los Angeles River, California. A McCaffrey heavy-duty clamshell spots a big stone and, at right, cleaning the stones before placing the concrete cover coat.

BARTLETT MFG. CO.
3035 E. Grand Blvd.
DETROIT 2, MICH.
Combination Pruner & Saw
AVAILABLE ON PRIORITIES 90-DAY SCHEDULE
EASILY CARRIED IN SMALL CAR OR MOTOR-CYCLE

Length	Weight
30 in. Pruner	2¾ lbs.
30 in. Saw	1½ lbs.
72 in. Section	2 lbs.
72 in. Section	1¾ lbs.

This combination can be quickly and easily assembled to make either of these two tools:
1 Heavy Duty Tree Trimmer (14¼" capacity) 14½ ft.
1 Fast-cutting Pole Saw 14½ ft.
If other lengths are required, specify extra sections 4 or 8 ft. long, to make the necessary length.

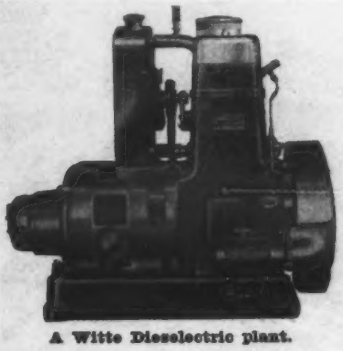
WORKMAN ACCIDENT RECORD



JOE MUST HAVE SWITCHED TO TRU-LAY PREFORMED WIRE ROPE!!
(Yes — it's safer to handle)

AMERICAN CABLE DIVISION
Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma
AMERICAN CHAIN & CABLE COMPANY, Inc.
BRIDGEPORT • CONNECTICUT

ESSENTIAL PRODUCTS... TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, MANLEY Auto Service Equipment, MARYLAND Bolts and Nuts, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Steel Castings, WRIGHT Hoists, Cranes . . . *In Business for Your Safety*



A Witte Dieselectric plant.

Economical Light From Diesel Plants

The economies of diesel power are well known to the construction industry. Full diesel engines use no sparkplugs or electric ignition systems and since the diesel converts its heat into power, it radiates less heat to the cooling system than a gasoline engine of the same power. Two gallons of diesel fuel will operate a 4-hp engine at full load for eight hours. The Witte diesel engine operates on the four-cycle principle which requires no complicated mechanism and eliminates the need for a diesel mechanic.

Witte Dieselectric plants are powered by the Witte diesel engine and are built in sizes from 3 to 10 kva. The 4-hp plant consists of a standard 4-hp Witte diesel engine direct or belt-connected to a generator to suit the requirements of the particular job and arranged for either manual or electric starting. Used as an auxiliary, the engine may also drive a pump, compressor, or hoist, because belt power may be taken from the engine when the full capacity of the generator is not being used. Because of this adaptability, many users of these Dieselectric plants purchase the next larger size than their current needs so that there will be more auxiliary power available.

Catalog No. 10, issued by Witte Engine Works, 1600 Oakland Ave., Kansas City, Mo., describes both the diesel engine and the Dieselectric plants with specifications, diagrams and numerous service photos. This catalog will be sent promptly to readers of CONTRACTORS AND ENGINEERS MONTHLY who write direct to the manufacturer and mention this news item.

Production Awards

Among the manufacturers in the construction field to receive additional recognition of their outstanding achievements in war production is the Barber-Greene Co., Aurora, Ill., which recently was awarded its fourth Army-Navy "E". This company is making ditchers, bucket loaders, asphalt mixers and finishers, and other construction equipment for the armed forces and Lend-Lease agencies.

The fourth star for its Army-Navy "E" pennant has just been awarded to the Clyde Iron Works, Inc., Duluth, Minn., for its production records in the manufacture of shipyard Whirleys, deck machinery, and material-handling and construction equipment.

The Continental Rubber Works, Erie, Pa., has also received its fourth Army-Navy Production Award and now displays three white stars on the Army-Navy "E" pennant first presented to the company on January 26, 1943, for its excellent record in producing materials essential to the war effort.

For the third time, the "E" Award has been made to the DeVilbiss Co., Toledo, Ohio, for maintaining its record of achievement. This company's products, which include spray painting equipment, air compressors, exhaust systems, hose and connections, medicinal atomizers, powder blowers, and some special items, have many uses in the nation's war effort.

The Lidgerwood Mfg. Co., Elizabeth, N. J., is one of the few companies to fly both the Army-Navy "E" pennant and the Maritime Commission "M" pennant. The latter was awarded to the company in September, for excellence in production of electro-hydraulic steering gears, electric boat winches, and other types of special-purpose hoisting machinery. A fourth star for its Army-Navy "E" pennant, for a period of one year, was also recently awarded to Lidgerwood.

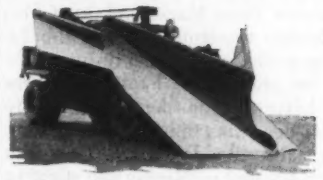
The men and women of the Macwhyte Co., Kenosha, Wis., manufacturer of wire rope, have received their third Army-Navy "E" Award, for continued excellence in production. This adds a second star to the company's "E" pennant.

Surveying Instruments Once More Available

The David White Co., manufacturer of surveying instruments and engineering supplies, reports that it receives many inquiries as to how levels or transits may be purchased. Apparently many contractors and engineers are unaware that a War Production Board ruling now makes it possible to secure equipment of this kind on a standard AA-2 MRO rating. This involves sending with the order a signed statement certifying that the controlled materials covered by the order are required for essential maintenance, repair or operating supplies, to be used for a purpose listed in Schedule I or Schedule II of CMP Regulation No. 5 and that delivery thereof will not result in a violation of the quantity restrictions contained in paragraph (f) of that regulation.

Full information on the White line of surveying instruments, as well as on the company's instrument repair service, may be secured by interested contractors and engineers by writing to the company at 305 W. Court St., Milwaukee 12, Wis.

FASTER • SAFER • CLEANER SNOW REMOVAL



***with* DAVENPORT-FRINK SNO-PLOWS**

You can meet every snow condition with engineer preferred Sno-Plows. Available in V-Blade and Straight Blade types for trucks, tractors and motor patrols, with or without leveling wings, with hand or power hydraulic operation.

DAVENPORT BESLER CORPORATION Dept. A DAVENPORT, IOWA

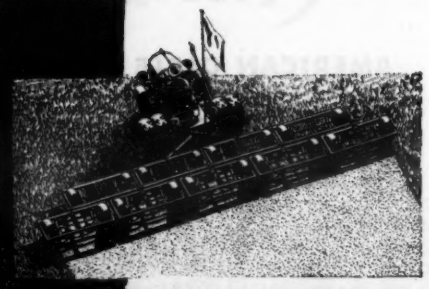
Made in Eastern U.S.A. by CARL H. FRINK, 1000 Islands, CLAYTON, N. Y.

THE ROAD AHEAD...and WORTHINGTON MOWING AND MAINTENANCE EQUIPMENT

Our war job — producing thousands of high-speed mowing units for the Air Forces of the United Nations — is almost finished. Today Worthington's famous airfield "Grass Blitzer" is keeping airfields in "fighting trim" from Italy to India...from America to Australia. Over 10,000 Worthington cutting units have been manufactured...and that's enough to cut over 50,000 acres an hour!

Now **your** problems of keeping tomorrow's highway shoulders in the best condition is uppermost in our post-war plans. We have no reconversion problem. We are looking forward with anticipation to serving you as soon as we are authorized to produce for other than military use. You will find Worthington mowing and maintenance equipment **better than ever...** with the experience of our war production added to our thirty years' background of producing the best machinery for keeping all types of turf in tip-top condition. If you have a mowing problem write us and we will gladly help you to solve it.

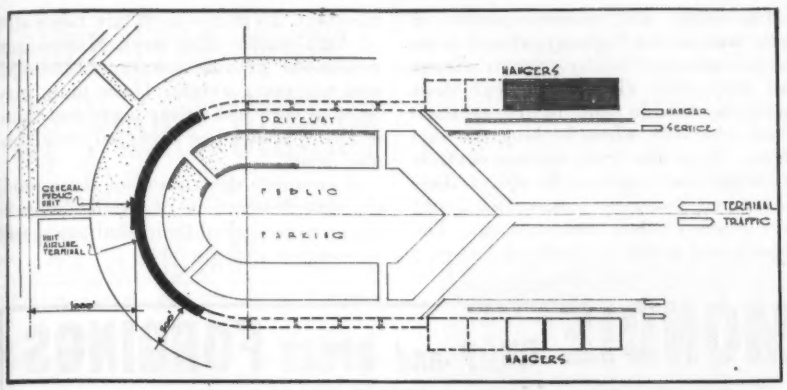
The Army-Navy "E" pennant (with star) flies over our plant as a tribute from the armed forces to our employees, our suppliers and our customers — without whose whole-hearted cooperation our all-out wartime production would not be possible.



WORTHINGTON MOWER COMPANY

STROUDSBURG • PENNSYLVANIA

Worthington distributors are located in all principal cities



A diagrammatic application of the unit type of airport terminal development, as conceived by Albert F. Heino, Architect for United Air Lines, Inc.

Plan Air Terminals That Grow Properly

The Unit System Allows for Slow or Rapid Expansion Without Congestion Of Passengers or Planes

✦ A DISCUSSION of tomorrow's typical airport terminal was presented recently by Albert F. Heino of Chicago, United Air Lines architect, before the Midwest Airport Managers Conference at Fort Wayne, Ind. "When one contemplates the estimated growth of air transportation from 350 commercial airliners before the war to a possible 5,000 commercial aircraft in domestic service within 20 years, it is not difficult to realize the urgency to plan now for adequate airports to handle this traffic. We must have vision, tempered by factual information, so that we may not only plan for the immediate future but make our plans flexible enough to permit a reasonable expansion beyond the expected demand. It is necessary that both the municipalities and the operating air lines work in close harmony and cooperation, taking advantage of the wisdom of each in planning for this growth," Mr. Heino said.

Early Air Transportation

In the early days of the air-transport industry, the air lines operated from their hangars. But as cargo and passengers increased, it was necessary to provide greater facilities, and a sort of combination hangar and passenger station resulted, the best example of which was the Newark, N. J., airport terminal before the war.

As the need for passenger and cargo-handling facilities increased, municipalities became aware of the need for passenger terminals to accommodate the growing number of air-line passengers, and air lines leased space in these buildings. It was only natural that the first airport terminals should be patterned after the best railroad-station design.

Many cities are now planning new terminals to be erected after the war, and Mr. Heino pointed out the importance of providing a greater degree of flexibility in design which will permit growth as business expands further.

Approach to the Problem

There are two general approaches to the solution of the air-terminal problem according to Mr. Heino: (1) the central plan, which is a continuation of the present method of concentrating all of the terminal activity in one location from which the air-line passengers are disbursed to plane berths; and (2) the decentralization plan, which permits the passengers, their baggage, and the mail and express for any given plane to go directly to the plane without passing through a central terminal building.

Airport Capacity

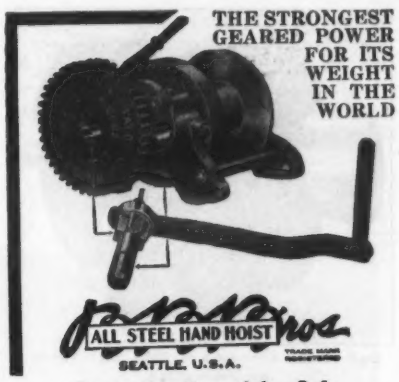
Recently the air lines of the country have undertaken joint studies on airport design. These studies have been made for airports using single-runway systems with a capacity of 45 movements an hour; for those having dual-runway systems and a capacity of 120 movements an hour; and larger ports with multiple runways and capacities of 240 movements an hour and up. Up to this time, runway pattern and capacity have been the major concern. It is generally agreed that 60 movements (take-off or landing) an hour per runway may be expected at airports having two or more runways in each direction. On a single-runway system, because it is necessary to make either a take-off or landing on the same runway, 45 movements an hour will probably be the maximum.

A definite relationship exists between runway capacity and required ramp space at the terminal. Allowing 30 minutes in and out per plane, it is necessary to provide a number of plane berths equal to 25 per cent of the runway capacity. As an example, an airport having a runway capacity of 120 movements an hour will require berths for 30 planes at the terminal; allowing 160 feet per plane, the linear footage required is 4,800 feet. Certainly the terminal design will be a factor in the expectancy of any airport to reach its theoretical runway capacity.

Decentralized Terminals

The decentralized type of terminal

(*Concluded on page* 53)



THE STRONGEST GEARED POWER FOR ITS WEIGHT IN THE WORLD

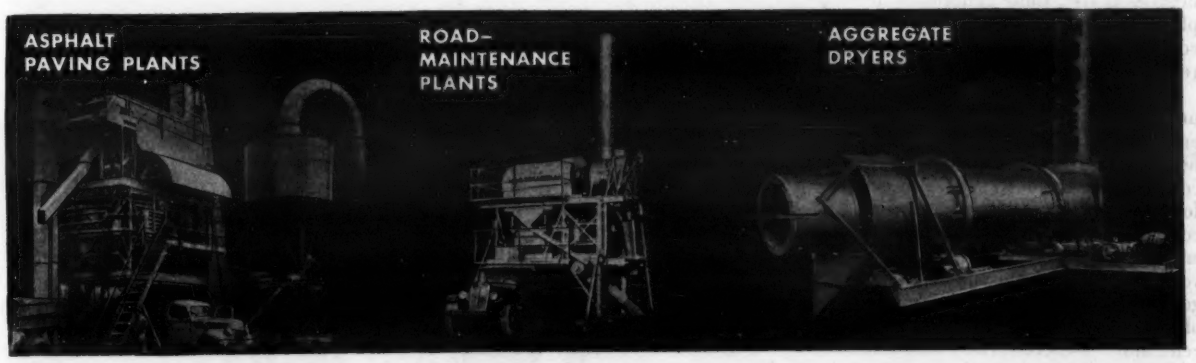
Beebe Bros. ALL STEEL HAND HOIST SEATTLE, U.S.A.

Compact—Powerful—Safe

STANDING ROOM ONLY FOR DURATION

Beebe Bros. All-Steel Hand Hoists carry the highest resale value of any piece of equipment in the world. If you have one not in use, sell it. Many more than are available are urgently needed in the win-the-war program. Thanks.

BEEBE BROS
2724 6th Ave., So., Seattle 4, Wash.

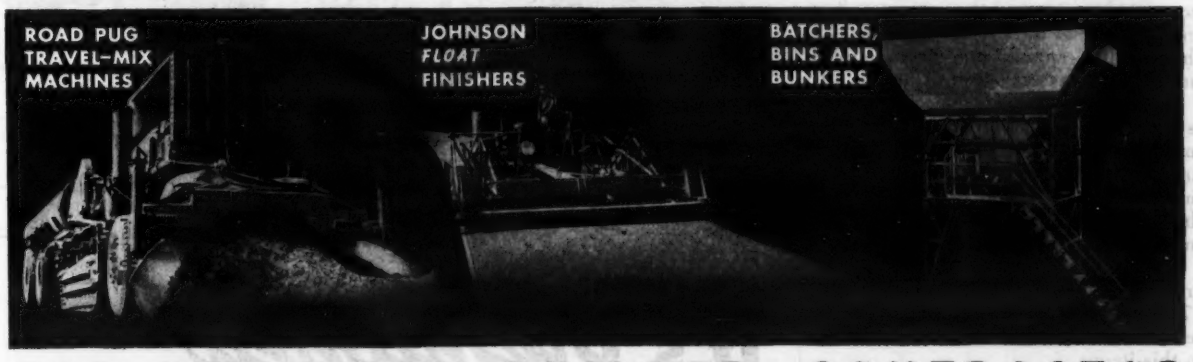


Record Breaking! MADSEN EQUIPMENT

BITUMINOUS MIXING PLANTS
BATCH CAPACITIES—500 to 6000 lbs.
RECORD (3000-lb. Plant)—2414 tons in 12 hours reported by Lewis Construction Co., on the Marine Base at El Toro, Calif.

BITUMINOUS MIXING PLANTS
BATCH CAPACITIES—500 and 1000 lbs.
MIXING SPEED—40-second cycle.
FEATURES—Jack Erection; Unit-Power Transmission; Asphalt Pressure-Injection.

COUNTER-FLOW TYPE DRYERS
SIZES—32- to 72-in. diam. All lengths.
FEATURES—Unit-Power Transmission; Flexible Ring-Sprocket Drive; Oversize Tires and Trunnions; All-Welded Shell.



FOR THE ROAD BUILDER—CONTRACTOR

FOR OIL-MIX, SOIL CEMENT & BASE
CAPACITY per hour—200 to 550 tons.
REPORTED by Phoenix Construction Co. 7920 tons in 20 hrs. to Calif. specifications.
METERED OIL—In ratio to travel speed.

FOR MECHANICAL *FLOAT* FINISHING
WIDTHS—convertible from 10 to 18 feet.
SPEED—3065 lineal feet by Roy Houck, Oregon. Consistently finishes pavement to .05 inch, or less, variation in 10 feet.

TRUCK LOADING BATCHERS, ALSO
Proportioner Plants; 1- to 6-unit Bins and Bunkers; Screening Plants; Central Mixing Plants; other batcher equipment.
CAPACITIES—From 25 to 400 tons.

Rubber-tired rollers have dual wheels with oscillating axle on walking beam. It kneads the soil as it compacts.

Pug Mill Mixers, weigh batchers, and all types of bin gates and feeders are available at Madsen Iron Works.

MADSEN IRON WORKS
HUNTINGTON PARK, CALIFORNIA

...FOR MORE INFORMATION

MADSEN IRON WORKS
HUNTINGTON PARK, CALIF.

Send information on the items checked.

☐ Asphalt Plants ☐ Road Pugs
☐ Maintenance Plants ☐ Batchers
☐ Float Finishers ☐ Bins & Bunkers
☐ Aggregate Dryers ☐ Compactors
☐ Pug Mill Mixers ☐ Weigh Batchers

NAME _____
COMPANY _____
ADDRESS _____

One of the new line of E-M high-speed ac generators.

Line of High-Speed Electric Generators

A new line of high-speed alternating-current generators has recently been announced by the Electric Machinery Mfg. Co., 1331 Tyler St., N.E., Minneapolis, Minn. Built in 18.7 to 125-kva sizes, 1,800 to 514 rpm, for standard voltages, one, two or three-phase, 50 and 60 cycles, 80 per cent power factor, 50 or 40 degrees C rise, these generators are supplied as two-bearing units for belted or coupled duty, or single-bearing for direct coupling to the driving engine.

They are also available as "packaged" units, with controls mounted on the generator frame, and wiring factory-connected. These packaged generators are compact, easily installed, and suitable for portable or stationary service. The controls consist of a NEMA Class 1 metal enclosure, housing the E-M Synchrostat voltage regulator and meters. No switchgear is required, three wires, for three-phase, being run to the load through the generator switch. The manufacturer states that quick responsive action of the Synchrostat minimizes voltage dips, and automatically holds the voltage at the nameplate rating.

Air for the ventilation of the generator is supplied by the E-M Pol-Aire ventilating system. A suction-type fan at the drive end of the generator pulls a large volume of air through both the direct-connected exciter and the generator. The intake of air at the exciter end, opposite the driving engine on direct-coupled units, prevents circulation of heated air.

The standard direct-connected exciter is of the quill type, mounted on an extension of the generator shaft, compact, and of drip-proof construction. Top-mounted exciters, with protected V-belt drive, are available on certain speed ratings below 1,200 rpm.

Further details on these E-M ac generators are contained in Publication No. 177, copies of which may be secured direct from the manufacturer by referring to this item.

Choose the Bearing To Fit the Service

For heavy-duty service, where long, hard use is daily routine and overloads are frequent, cageless-type tapered roller bearings have definite and tangible advantages. In applications where lighter loads do not demand the extra capacity afforded by cageless bearings, then cage-type bearings can be used. Tyson Bearing Corp., Massillon, Ohio, in its special service bulletin giving the Tyson tapered roller bearing specifications for various types of tractors, farm machinery, and road equipment, states that Tyson cageless bearings have 30 per cent greater radial and thrust capacity than conventional-type bearings so that they stand up under correspondingly heavier loads, and "shed side-sway like water on a duck's back". Tyson cageless and cage-type tapered roller bearings are interchangeable, size for size. Furthermore, Tyson cones may be used with conventional cups, and vice versa.

A copy of the roller bearing specifications for the various machinery mentioned above may be secured by writing direct to the manufacturer.

Shovels and Cranes, Truck-Mounted Units

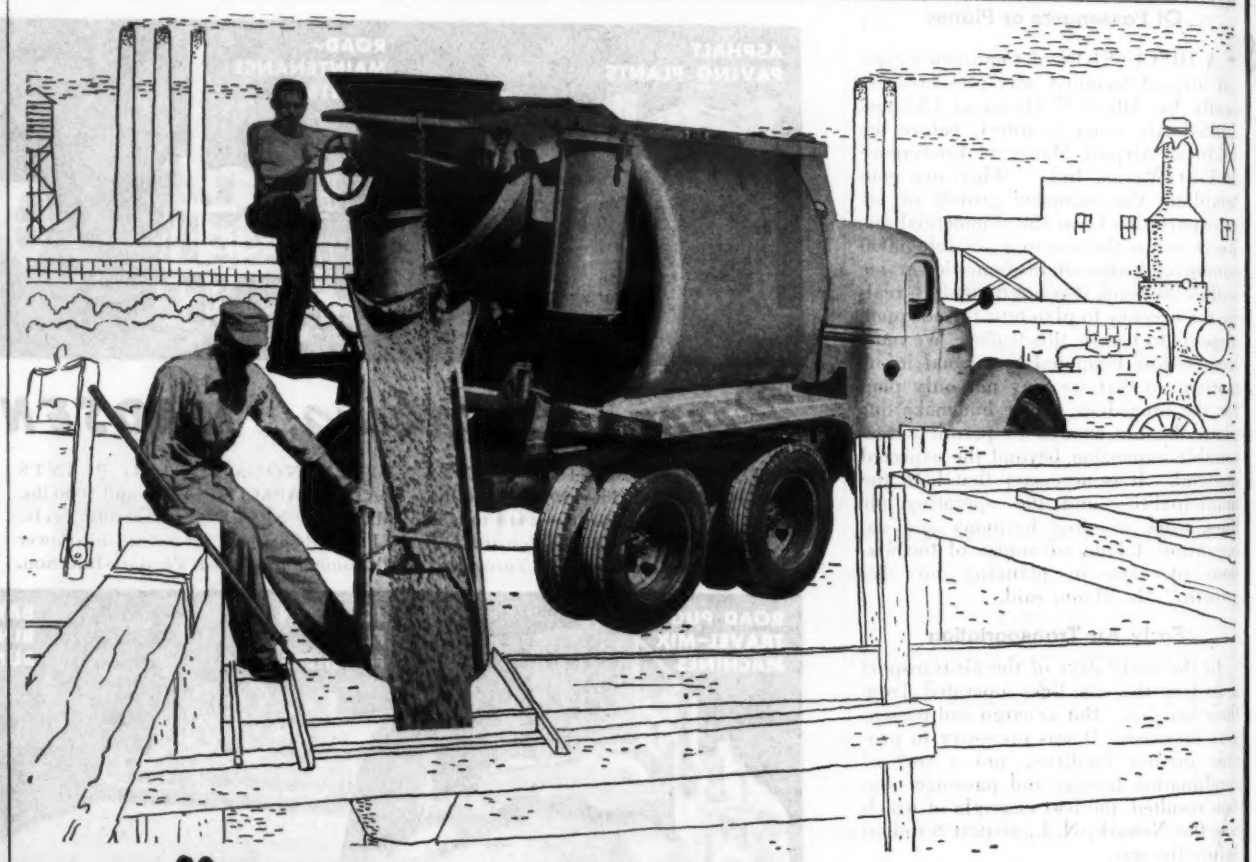
Two models of truck-mounted cranes and shovels, which are convertible from one use to the other, are in current production by the Michigan Power Shovel Co., Benton Harbor, Mich. The Michigan Model TMDT-16 is a 10-ton crane or a ½-yard shovel, making it possible to switch from one type of work to another quickly, as well as to move the entire machine long distances under the power of the motor truck. The TLDT-20 is a 12-ton capacity unit especially designed for crane work but convertible to ½-yard shovel use. An extra heavy-duty hoisting drum and extra counterweighting for added stability on heavy lifts and wide ranges are available.

Both of these models are built by Michigan Power Shovel from the ground up and are designed for fast loading, 30-mph highway speed, and with outriggers as optional equipment at extra cost for unusually heavy-duty crane work or in substandard ground conditions.

The safety and maneuverability of these units on the highway, as well as on the job, are cared for by a roomy chassis cab with clear vision. The cab door swings forward in order to provide maximum visibility when backing the machine. All of the truck chassis controls are within easy reach of the driver, their convenient grouping making for faster and more efficient maneuvering. The chassis and frame are built of box-type members, 15 inches deep, are fabricated of high-tensile alloy steel, riveted and welded to provide maximum strength and minimum weight. These units may be used with pile driver leads and there is also a trench-hoe mounted on a tubular boom.

A complete description of these models, with illustrations of the machines in action as well as of their vital parts, will be found in Bulletin 544.

MONDIE DROP and UPSET **FORGINGS**
FOR CONSTRUCTION EQUIPMENT
Such as Dipper Teeth, Trencher Teeth, Gear Blanks, Levers, Tie Rods, Cranks, Crank Shafts, Special Shapes, etc. Forging weight range from 1 to 50 pounds.
Inquiries given prompt attention by our Engineering Dept.
MONDIE FORGE COMPANY INC.
10299 Berea Road Cleveland 2, Ohio



It's *"Cushioned"* to cut maintenance costs!

YOU can forget about the dangers of road shocks—of weaving and sidesway—the strains of quick starts and stops with a fully loaded drum—*if* your truck mixer is a Rex.

For the drum of a Rex Moto-Mixer rides on a cushion . . . the exclusive chain belt drive that absorbs all shocks and stresses. There are no unyielding gears and pinions to transmit damaging shocks directly to the costly transmission and power plant.

Many Moto-Mixer owners say this one feature alone is enough to make Rex their choice . . . that their maintenance costs are practically limited to greasing and cleaning.

And there are other advantages you get with Rex and Rex only. You get 100% accurate water system; 5-in-1 Quint Spout; the exclusive Rex Hi-Lo Mixing action; the Rex end-charging hopper; revolutionary visible mixing; Rex unrestricted discharge; and many others.

• • •

FOR INFORMATION on Rex Moto-Mixers, send for your copy of Bulletin No. 405. And check the other Rex construction equipment: Mixers, to cut concrete placing costs; Pavers, that can give you really heavy yardage production, faster; Pumpcretes, that pump concrete by pipeline . . . Pumps, that move water economically and efficiently. See your Rex Distributor, or write direct to Chain Belt Company, 1666 West Bruce Street, Milwaukee 4, Wisconsin.

REX CHAIN BELT COMPANY *of Milwaukee*

CONSTRUCTION MACHINERY

Better Tree Work By Public Utilities

Kansas Highway Commission Secured the Cooperation of Utility Companies Before State Had Adequate Laws

By FRANKLIN T. ROSE, Landscape Architect, State Highway Commission of Kansas

✦ SECURING the cooperation of all individuals and corporations in a tree-conservation program along state highways is difficult. Without adequate laws to support the State Highway Commission, Kansas was able to put its program across with fair success. Credit is due chiefly to Walter V. Buck, former State Highway Engineer, and now with the Public Roads Administration in Ohio, who sent letters to all utility companies operating in Kansas, urging their cooperation and compliance with the best practice. There was some opposition at first, but Mr. Buck was firm. Willing cooperators soon filled out application forms to do tree-pruning work under the rules and regulations set up by the State Highway Commission.

A State Law, House Bill No. 249, passed in 1943 by the Kansas State Legislature, now provides for the protection and preservation of all shrubs and trees growing on any state highway right-of-way; prohibits the destruction, mutilation, cutting, or removal of such shrubs and trees; and establishes penalties for violation of the Act. This law gave the state highway forces the legal backing which they had not possessed before. It is a fact, however, that good cooperation had been secured from nearly all of the utility companies, even though the earlier statutes were not clear as to the ownership of trees on the highway right-of-way. Before the present law was passed, there were several embarrassing circumstances where utility companies did not cooperate, arguing that the state did not own the trees. In several of these instances, a talk with representatives of the utility companies, explaining why the state was interested in conserving roadside trees, gained a better understanding.

Permits and Bonds

Under the present law, there has been prepared a standard highway permit form which utility companies use when applying for permission to trim trees. This permit, Form No. 304, sets forth the type of work to be done, its location, and the length of time required. With the application, the petitioner files a certified check in the amount of $1.00 for each tree to be trimmed, with a minimum deposit of $25.

In the supplemental specifications for highway permits, Form No. 305, the item under "Tree Trimming" states that the best horticultural practices in tree trimming must be followed, in which the method and amount of growth removed are determined by the Highway Landscape Architect. The petitioner is required to remove from the view of passing motorists, and clear away from the highway right-of-way, all cut branches, dead limbs, etc., taken from roadside trees. Such material may not be burned along the roadside unless special permission has been obtained. The petitioner is held liable for any damage to grass, crops, native shrubs or trees arising from careless burning of brush.

Character of Work

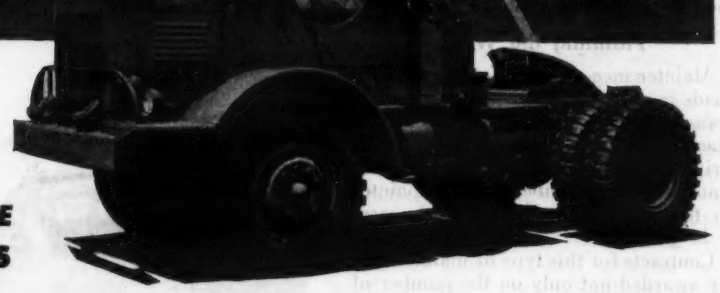
The State Highway Commission does not have the legal right to regulate the pruning or trimming of trees on private property, except those trees that overhang the highway right-of-way to the extent that they become a traffic hazard. The Commission merely requests that proper pruning methods be followed when clearing lines of foliage on private property so that the maximum roadside landscape beauty will be maintained.

The petitioner is required to remove

(*Concluded on page* 59)

FROM WAR-TIME EXPERIENCE . . .

TO PEACE-TIME SERVICE and BETTER VEHICLES



For ten years before the Japanese attacked Pearl Harbor, Marmon-Herrington was designing and building special vehicles required for the world's most difficult civilian and military services. These vehicles, utilizing the *All-Wheel-Drive* principle, were prime favorites of users in the oil, logging, public utility, road building and road maintenance services of our own and many foreign countries. Their ability was unexcelled.

Now, with almost four years of experience in building vehicles exclusively for the rigorous services of armed forces, we will have *still greater performance and reliability* to offer our industrial customers, when Peace comes. If your job calls for more than usual ability in trucks, remember the name MARMON-HERRINGTON. Plan *now* to add Marmon-Herrington units to your fleet, as they become available. Write for literature.

MARMON-HERRINGTON

All-Wheel-Drive TRUCKS

MARMON-HERRINGTON CO., Inc., INDIANAPOLIS 7, INDIANA

Cable Address: MARTON

"Straddledeck" TRAILERS

meet SPECIAL NEEDS

ROGERS BROTHERS CORP., ALBION, PENNA.

Bulky, cumbersome machinery, and of late heavy pieces of defense equipment must be moved from place to place.

In some localities, where low headroom is encountered, this type of Rogers Trailer is used extensively.

Large machines, with crawler treads "straddle" the girders thus lowering the overall height by several inches, a definite advantage also in handling many kinds of equipment.

ROGERS TRAILERS

Tractor-mounted Loader Wanted

Speeder loader, crane or shovel, built for RD-6 Caterpillar Tractor. State location, condition and price. Address:

Dierks Lumber & Coal Co.

1006 Grand Avenue Kansas City, Missouri

★ If War Bonds aren't safe, no other investment matters. So buy War Bonds with every dollar you can find.

6th WAR LOAN

Concrete Patching On Illinois Roads

Contract for 4,200 Yards Of Concrete for 800 Patches On 60 Miles of Highways Near Springfield

✦ A 60-MILE length of concrete paving which was built in the years 1927 to 1930 near the cities of Decatur, Taylorville, and Springfield, Ill., was repaired during the past season by cutting out the broken and cracked sections and replacing these areas with concrete patches 9 and 10 inches thick. The work, which was done by contract, included about 800 patches, varying in length from 3 feet to over 15, and covered the 29 miles on State Route 48 from Decatur to Taylorville, 27 miles on Illinois 29 from Taylorville to Springfield, and a 4-mile stretch on U. S. 66 from the vicinity of Glenarm south to the Sangamon County line. To make these patches 4,200 square yards of concrete was used.

The Illinois Division of Highways awarded the contract for this work to Joyce Brothers Contracting Co. of Springfield, Ill., for $47,000. This company, busy with construction in war plants, turned part of the job over to the Zimmerly Construction Co. of Paris, Ill., and the Walker Construction Co. of Mattoon, Ill. The contract also included the excavation of 8,000 cubic yards of earth in deepening road ditches, which was done by a power blade and a tractor-mounted front-end loader.

Planning the Work

Maintenance engineers rode over the roads in need of repair and selected the areas to be patched. Each broken or cracked area was outlined with a broad strip of white paint, measured, and given a number. This number was also painted on the pavement adjacent to the area to be patched.

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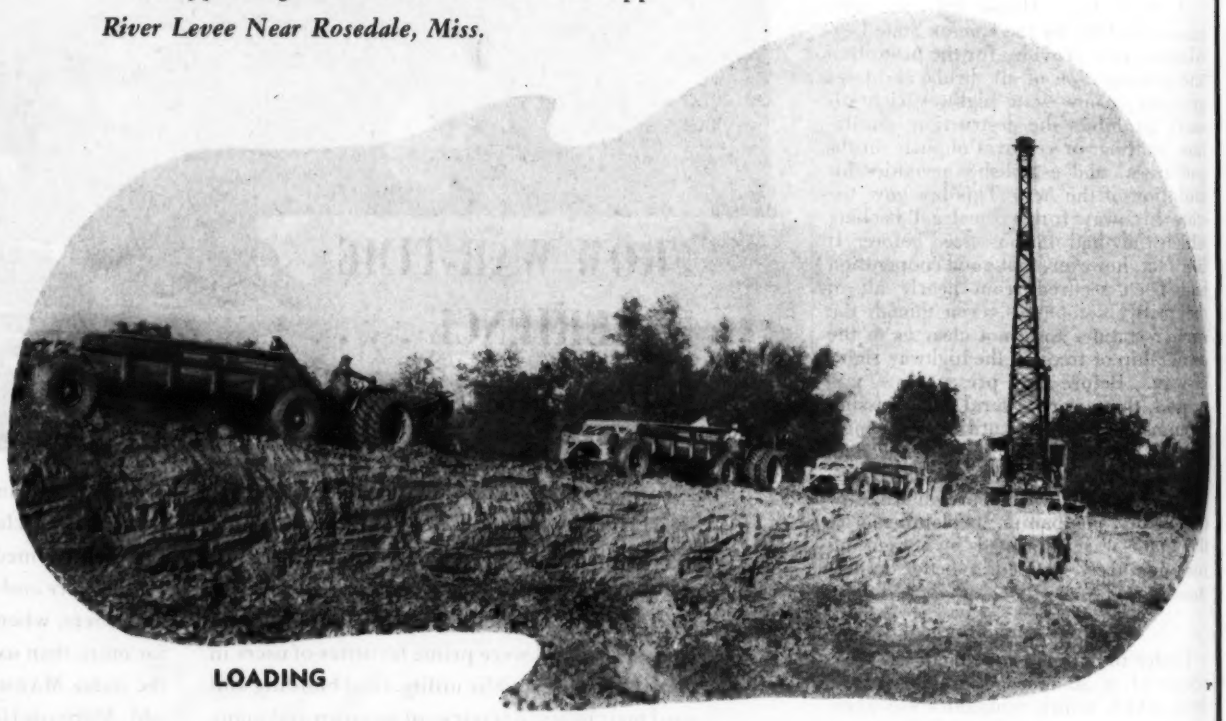

LOADING

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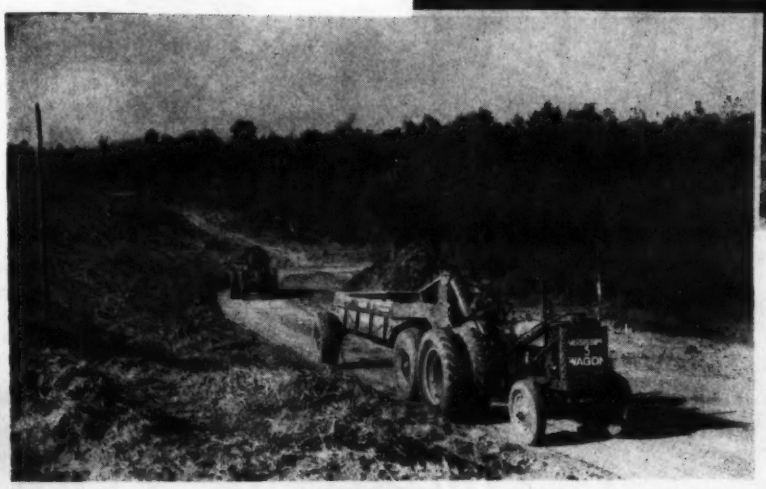

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M-R-S MANUFACTURING CO.

JACKSON, MISSISSIPPI

Concrete Patching On Illinois Roads

Contract for 4,200 Yards Of Concrete for 800 Patches On 60 Miles of Highways Near Springfield

✦ A 60-MILE length of concrete paving which was built in the years 1927 to 1930 near the cities of Decatur, Taylorville, and Springfield, Ill., was repaired during the past season by cutting out the broken and cracked sections and replacing these areas with concrete patches 9 and 10 inches thick. The work, which was done by contract, included about 800 patches, varying in length from 3 feet to over 15, and covered the 29 miles on State Route 48 from Decatur to Taylorville, 27 miles on Illinois 29 from Taylorville to Springfield, and a 4-mile stretch on U. S. 66 from the vicinity of Glenarm south to the Sangamon County line. To make these patches 4,200 square yards of concrete was used.

The Illinois Division of Highways awarded the contract for this work to Joyce Brothers Contracting Co. of Springfield, Ill., for $47,000. This company, busy with construction in war plants, turned part of the job over to the Zimmerly Construction Co. of Paris, Ill., and the Walker Construction Co. of Mattoon, Ill. The contract also included the excavation of 8,000 cubic yards of earth in deepening road ditches, which was done by a power blade and a tractor-mounted front-end loader.

Planning the Work

Maintenance engineers rode over the roads in need of repair and selected the areas to be patched. Each broken or cracked area was outlined with a broad strip of white paint, measured, and given a number. This number was also painted on the pavement adjacent to the area to be patched.

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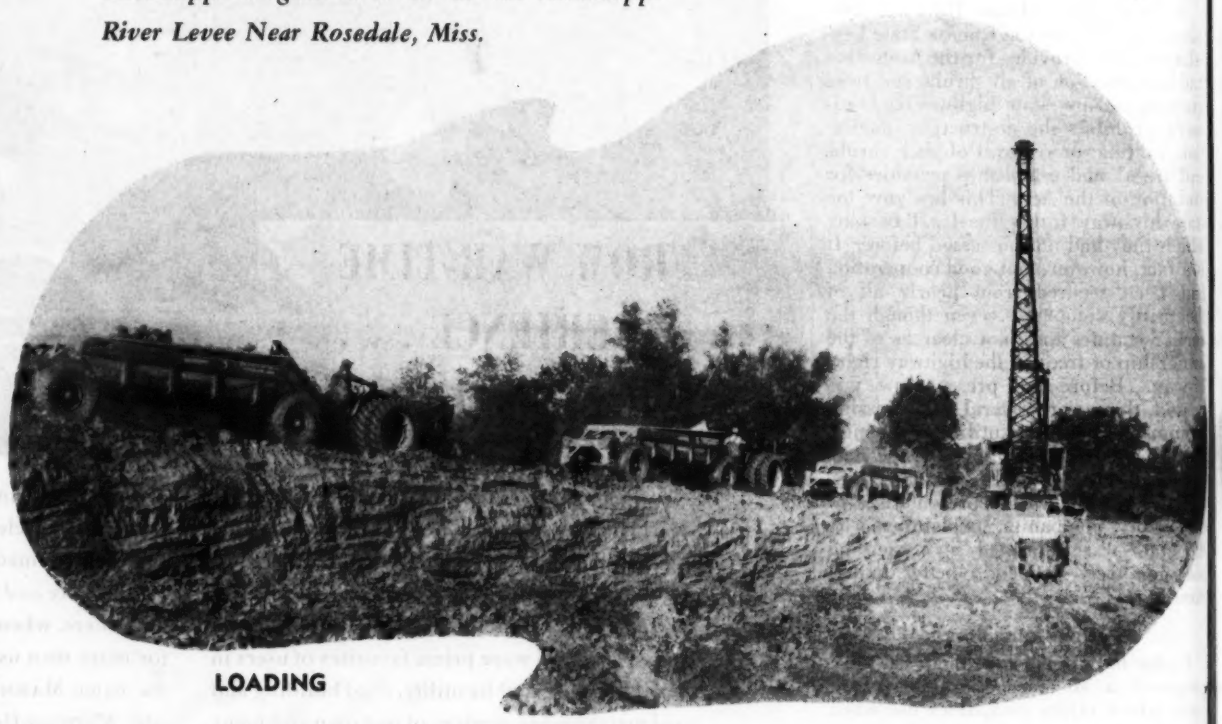

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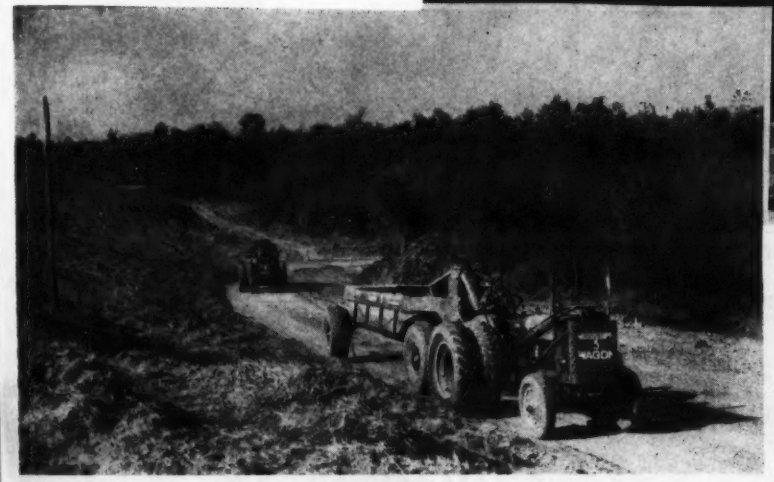

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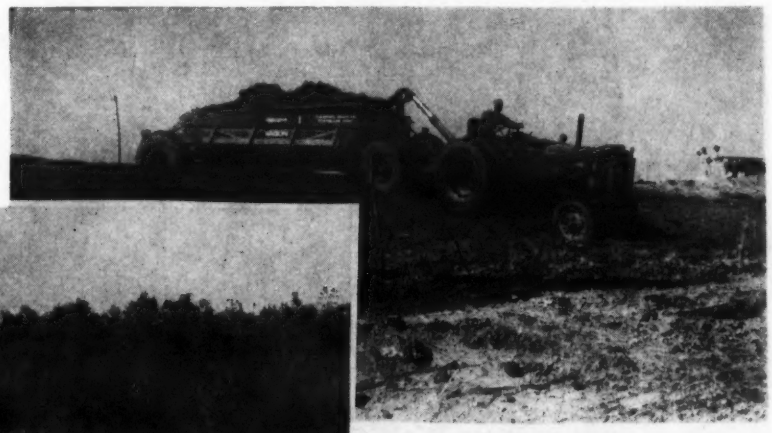

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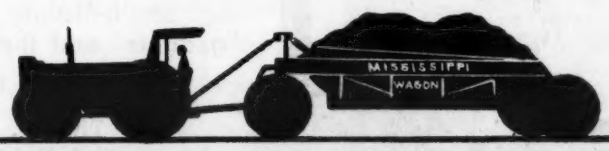

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The Battle With Ice On Connecticut Roads

(*Continued from page* 12)

lets are opened where necessary to insure adequate run-off during thaws. State-maintained sidewalks are cleaned and snow which obscures the visibility of warning and directional signs is removed. In rock cuts, at culverts or bridges, on roadside improvements, in urban centers, or any other similar location, piles of snow that are likely to constitute traffic hazards or damage roadside improvements are loaded into trucks, hauled away, and disposed of at suitable locations.

Ice Conditions

When the main body of the travel way is bare but ice has formed at certain isolated or non-continuous locations, following thawing, frost action, or the like, these isolated locations are kept thoroughly sanded by the maintenance crews. Conditions at such locations are anticipated as much as possible, based on previous experience. In some cases of lowering temperature, sections of wet pavement are sanded in advance of actual ice formation.

When an icy condition prevails generally, over a district or the state, as during an ice storm or following some snow storms, sand is spread first only at the locations of greatest hazard, such as steep grades, sharp curves, intersections and the like, on the more heavily traveled highways. Next, provided no resanding is required at these extra hazardous locations, similar locations of great hazard on the less heavily traveled roads are sanded. Then, provided resanding is still not required, the remaining sections of both types of road are sanded, those of the more heavily traveled roads being done first. This order of preference is maintained as long as sanding is necessary.

The amount of sand and the method of spreading depend on the type of ice which has formed and on prevailing conditions. In general, light overall sanding, preferably by machine, is used for conditions involving light films of ice, calm wind, and rising temperatures. On the other hand, sanding with heavy concentrated deposits spotted over the surface is used when there is thick hard ice, packed snow, high wind, and low temperatures.

When ice has built up from the shoulder onto the travel way, due to the freezing of accumulated surface or subsurface water, it is considered advisable, in the interest of economy and safety, to remove the ice entirely from the highway. The usual procedure is to chop the ice from the pavement surface by hand and throw it onto the roadside. The cost of hand-picking ice resulting from the lack of subdrainage, as differentiated from ordinary sanding of ice, for the years 1936 through 1943, is shown in the following table:

Removal of Ice from Pavements

Mileage	Date From	Date To	Amount
2,728	1936	1937	$16,833.19
2,765	1937	1938	28,528.12
2,781	July 1, 1938	June 30, 1939	37,860.19
2,820	1939	1940	68,635.23
2,863	1940	1941	46,096.58
2,890	1941	1942	32,739.24
2,897	1942	1943	23,795.10
2,897	1943	1944	23,672.56

The cost of this activity increased from 1936 to, and including, the winter of 1939-40. Connecticut's underdrainage program was started in the summer of 1940 and has contributed greatly to the steady decrease in the cost of hand-picking of ice from the peak in 1939 to the winter of 1942-43. During the winter of 1943-44, costs to February 21, 1944, were $23,672.56 as compared with $23,795.10 for the preceding winter.

Frost Boils

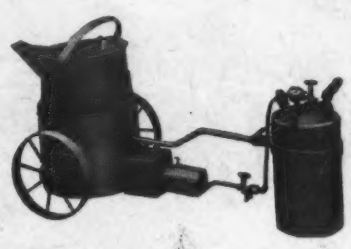
The Bureau of Maintenance has been assisting the Soils Laboratory in conducting field tests of calcium-chloride treatment of frost boils in pavements. One location on concrete pavement on U. S. 6 in Windham, near the airport, and one location on oil-treated gravel on U. S. 6A in Columbia were treated during the winter of 1942-43. At the Windham location results have not been conclusive. Heaving of the concrete pavement slabs took place during the winter of 1943-44. At the Columbia location the pavement remained stable during the winter of 1943-44, indicating reasonably good results at this location.

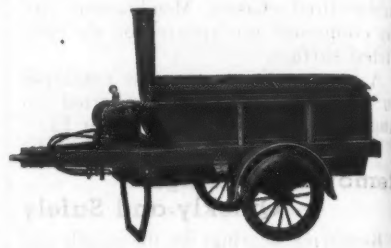
On Connecticut 84, in the Towns of Stonington and North Stonington, extensive pavement breaks occurred in the winter of 1942-43. The frost-boil treatment consisted of excavation of the clay under the pavement to a depth of about 18 inches and replacement of the excavated material with clean bank-run gravel, which was carried out on the shoulders on fills to provide a bleeder from the gravel base. The results have been satisfactory and no further breaks

(*Concluded on next page*)

For Speedy heating of tar and asphalt—

Use this CONNERY oil-burning Patrol Patching Heater on the *small* job and this CONNERY oil-burning kettle for *large-quantity* production.

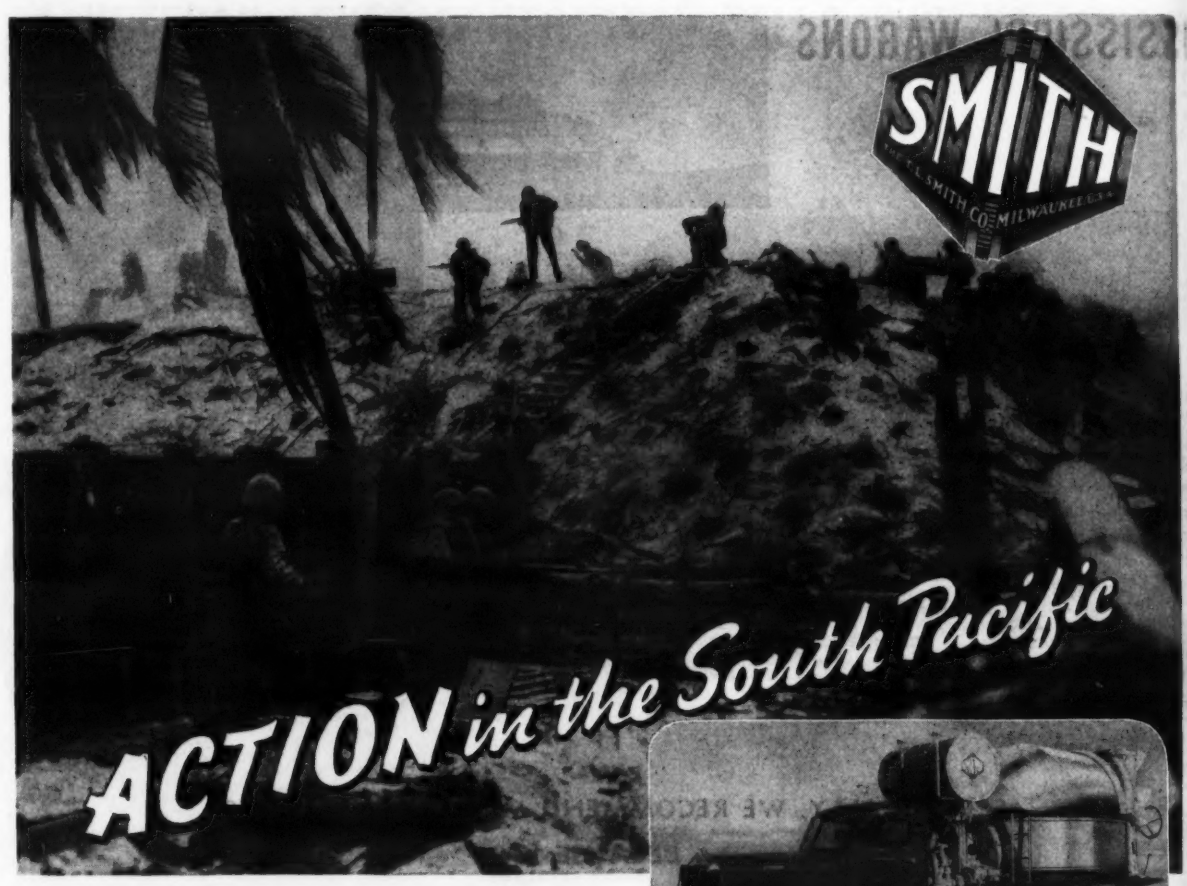




Write for catalog showing our full line of tar and asphalt heating kettles, spraying attachments, pouring pots, etc.

Connery Construction Co.

2nd and Luzerne Streets — Philadelphia 40, Pa.



Out Where Speed and Dependability are "Must" Orders, SMITH TILTERS and SMITH-MOBILES are Pouring Fortifications!

Smith-Mobile charges faster because the wide feed chute has no obstructions—no shafts or rods to clog it up. *Smith-Mobile* mixes faster and better because of its patented "T" shaped spiral blades. It mixes without pressure against the discharge door. *Smith-Mobile* discharges under complete control, either fast discharge or a wheelbarrow full at a time. You can open the end door and inspect the concrete while the drum is mixing. *Smith-Mobile* is simple and rugged with fewer "gadgets" and therefore fewer troubles.

Write today for booklet giving the details.

The T. L. SMITH COMPANY

2857 N. 32nd STREET • MILWAUKEE 10, WISCONSIN

CONCRETE MIXER MANUFACTURERS SINCE 1900

"Safety First" Marks Conn. Winter Work

(*Continued from preceding page*)

have occurred at these locations.

Safety Precautions

The Bureau of Maintenance has given considerable study and thought to the safety of the traveling public and also to the protection of its own employees through safety measures. Maintenance employees are not permitted to ride snow plows or to allow any other person to do so. If the plows must be weighted to secure most efficient operation, stone, concrete block, or sand in barrels must be used.

In all snow and ice work, care is exercised to avoid damage to guide railing, roadway surface, roadside plantings, highway signs and the like, as well as the property of private individuals.

Both salt and calcium chloride are used on black-top pavements in amounts up to ¼ pound per square yard per storm. No calcium chloride is permitted to be used on concrete pavement, and salt is used on concrete pavement only in amounts and at locations authorized by the Director of Maintenance.

Each Supervisor reports conditions in his district by telephone, not only at the start of a storm, but also at intervals during its progress. These reports are made to the Engineer of Highway Surfaces, or his designated representative at the Central Office.

Post-Winter Adjustments

In the spring of each year all equipment which has been used exclusively in winter work is thoroughly inspected and arrangements made for proper storage or overhauling in the summer. All sand and debris which has collected along the traveled path and shoulders of highways is swept up and removed. The cost of this work is charged as part of ice and snow costs in the Bureau budget.

Snow fences are removed in the early spring, usually during the month of March, before the growing season starts. They are dismantled and hauled to central storage points, and arrangements made for repair and reconditioning. At the locations where fences are taken down, all debris, broken parts, stakes, etc., are collected and removed, and the areas left in as good condition as before the fences were erected.

Personnel

William J. Cox is Commissioner, Connecticut State Highway Department, with A. L. Donnelly, Director, and H. C. Carsten, Associate Director, of Maintenance.

One of the serrated blades used by Connecticut for removing hard-packed snow from state highways.

A Dredger's Bulletin On Manganese Steel

A 56-page catalog-bulletin has recently been issued by the American Manganese Steel Division of American Brake Shoe Co., 398 E. 14th St., Chicago Heights, Ill., describing the important part played by Austenitic manganese steel, "the toughest steel known", in the operation of dredges of all types.

Ladder-dredge operators will be particularly interested in the exhaustive discussions, and illustrations, of the parts subjected to wear, such as buckets and bucket lips, pins and bushings, tumblers, ladder rollers, etc. Another section of the booklet deals with dipper dredges and the problems encountered in subaqueous excavations with equipment of this type. Illustrations of various types of dippers, buckets, bails, stick racks, pinions, etc., are included.

Bulletin 844-D also contains material on pumps for suction dredges, pipe-line fittings, the Eagle Swintek screening cutterhead, sheaves, gears, rollers, etc. Copies of this bulletin will be furnished free to readers who write direct to the manufacturer.

Warco Dealer Named For Three N. E. States

The Dyar Sales & Machinery Co., 247 Third St., Cambridge, Mass., has been appointed to sell and service the Warco line of road-buildng machinery in the states of Massachusetts, New Hampshire, and Rhode Island. The line of equipment, made by the W. A. Riddell Corp., Bucyrus, Ohio, includes hydraulic-control motor graders, hydraulic scoops, light maintainers, graders, rotary scrapers, and the Hercules line of road rollers and Ironerollers.

SAND'S Aluminum Line & Surface LEVEL

Endorsed and Adopted by Road Builders and Contractors

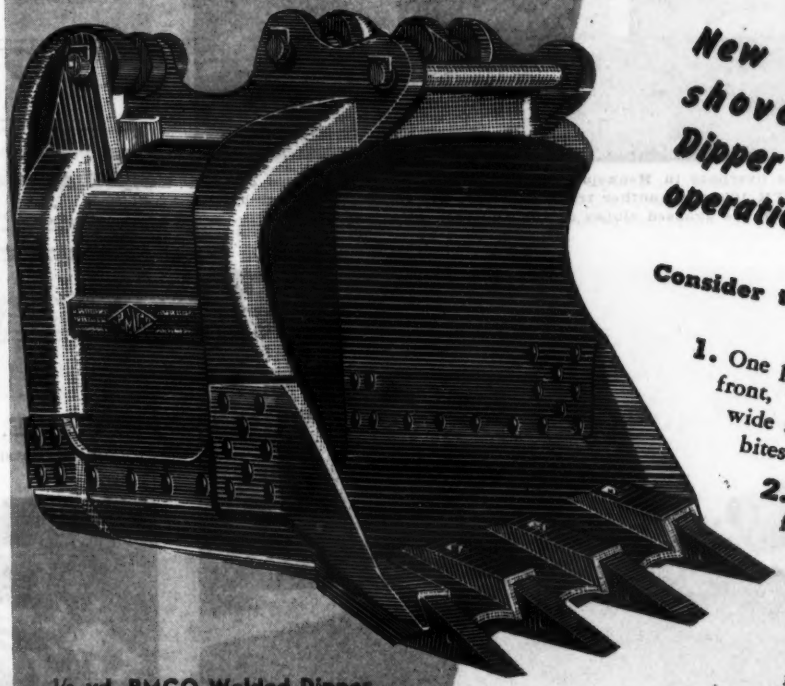
Level is easily and quickly attached to line. Special feature construction prevents accidental detachment from line. Construction is sturdy, and accuracy guaranteed.

SAND'S LEVEL & TOOL CO.
8331 Gratiot Ave. Detroit 13, Mich.

PMCO

WELDED DIPPERS

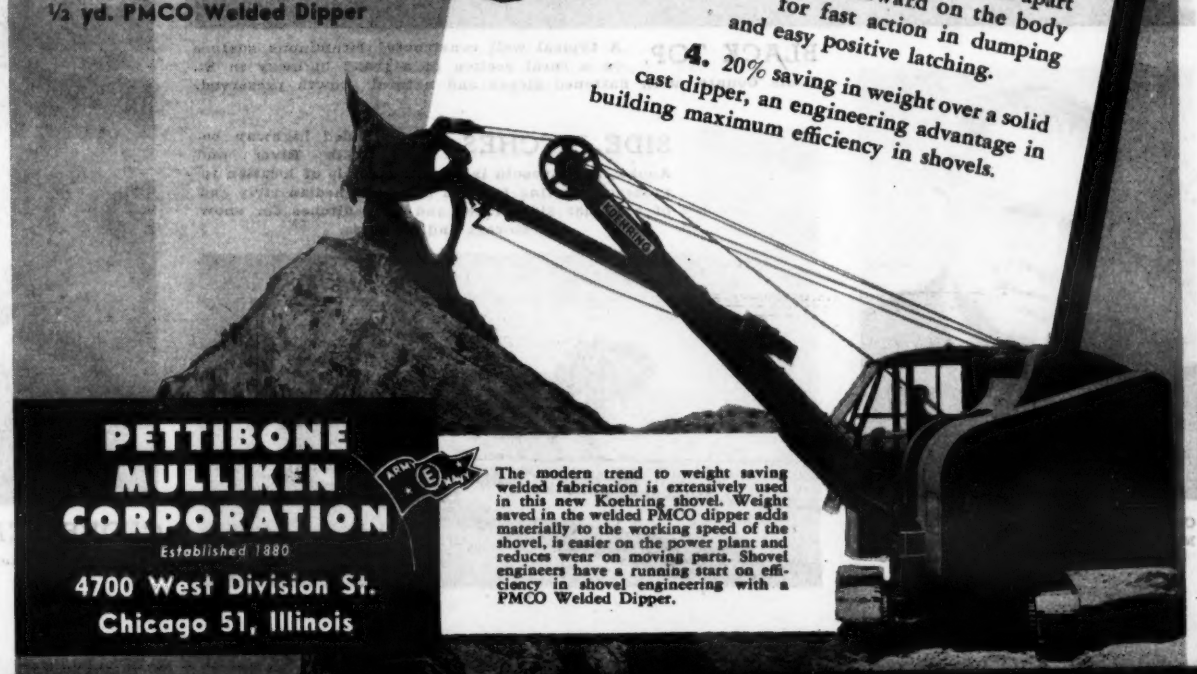
New half-yard Koehring shovel uses PMCO Welded Dipper for fast, cost-cutting operation . . .



½ yd. PMCO Welded Dipper

Consider these structural features—

1. One piece full length 14% manganese front, with ample strength to support wide set corner teeth that give wider bites with less digging resistance.
2. Tapered body and curved door for free dumping of wet sticky material and the elimination of "hard-to-fill" corners.
3. Hinges set wide apart and forward on the body for fast action in dumping and easy positive latching.
4. 20% saving in weight over a solid cast dipper, an engineering advantage in building maximum efficiency in shovels.



The modern trend to weight saving welded fabrication is extensively used in this new Koehring shovel. Weight saved in the welded PMCO dipper adds materially to the working speed of the shovel, is easier on the power plant and reduces wear on moving parts. Shovel engineers have a running start on efficiency in shovel engineering with a PMCO Welded Dipper.

PETTIBONE MULLIKEN CORPORATION
Established 1880
4700 West Division St.
Chicago 51, Illinois

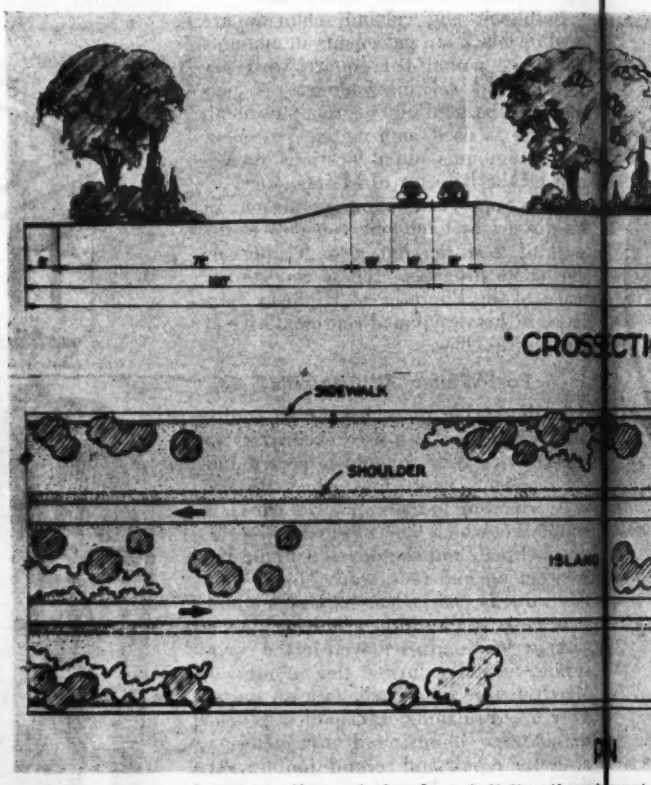
Some Pre-Wa Of Post-War C

Minnesota Had Sted Highway and Brie Before the War; Empl Presage the Type of tu

M. J. Hoffmann, Commissioner, Minnesota Department of Highways.

SNOW STORAGE. The wide depressed median strip with center drains on this divided highway serves to store snow plowed from the roadways and prevents snow water running back onto the roadway.

GRADE SEPARATION. A concrete overpass in Hennepin County, Minnesota, separating a divided highway, TH 100, and another trunk highway, TH 12, is well set off by the judicious group planting of shrubs and trees on the grassed slopes of the approach fills.



BELT LINE. A cross section and plan for a belt line through country future construction in Minnesota. A 300-foot right-of-way with 10-foot outside shoulders. Back of the 72-foot roadside areas

BLACK TOP. A typical well constructed bituminous surface on a rural section of a trunk highway in St. Louis County, with flattened slopes and natural growth preserved.

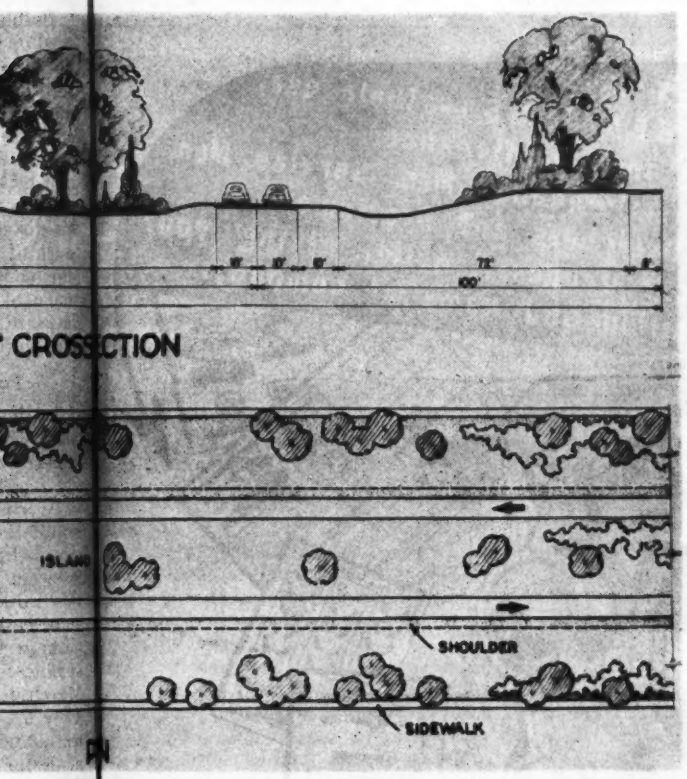
C. L. Motl, Maintenance Engineer, Minnesota Department of Highways.

SIDE DITCHES. The divided highway between Elk River and Anoka in Minnesota is a good example of location to preserve existing trees in the wide median strip and of safe flat side slopes and wide ditches for snow storage and drainage.

CLOVERLEAF. An aerial view of the intersection of U. 12 and TH 100 just west of Minneapolis. well designed interchange showing an advantageous handling of local service roads.

-War Samples arConstruction

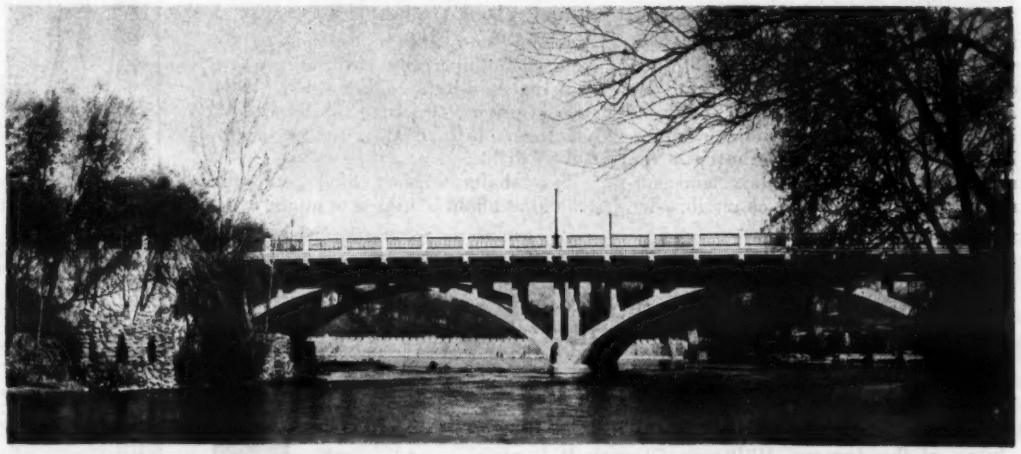
ad Sted Its Program of d Brie Modernization ur; Exples from the Past pe ofture Improvements



line through country which is being followed extensively in post-war plans for A 300-foot right-way allows for an 80-foot center strip flanked by 20-foot highways adside areas foot sidewalks.

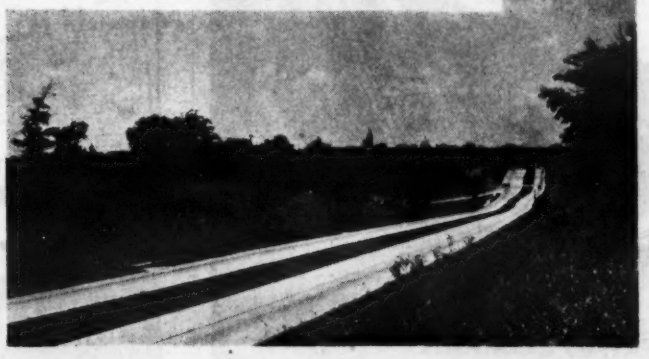
O. L. Kipp, Minnesota's Assistant Commissioner and Chief Engineer.

ROADSIDE PARKS. The entrance sign to a roadside parking area on Trunk Highway 100 in Hennepin County is sturdy, attractive and readily seen by travelers. The concourse and parking area on the Mississippi River near Stillwater, lower photo, provides a restful view.

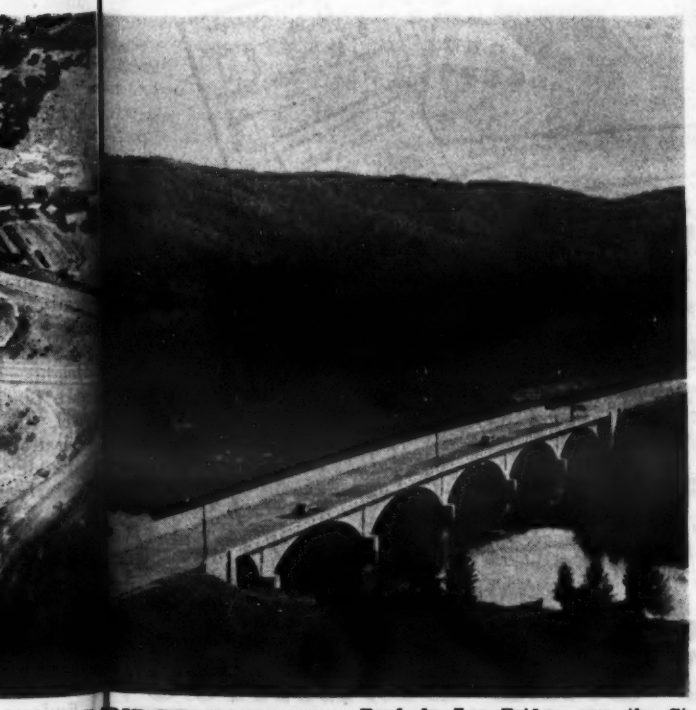


BRIDGE. An attractive two-span reinforced-concrete spandrel arch bridge in scenic surroundings in Anoka County, Minnesota, carries TH 10 across a stream.

METROPOLITAN HIGHWAY. Trunk Highway 12 is a divided dual-lane concrete highway carrying through traffic from the east into St. Paul, capital city of Minnesota. Well planted roadsides and terraced slopes prevent erosion.



G. G. Gladman, Engineer of Plans and Surveys in Minnesota.



section of U. Minneapolis, handling of t

RIDGE REBUILT. Fond du Lac Bridge over the St. Louis River, on TH 23, is a modern concrete arch structure, rebuilt by the Minnesota Department of Highways in 1942 and typical of new post-war river crossings.

Contractors Tackle Mica Mining in N. H.

(*Continued from page 23*)

surface. Here, among the masses of granite, are found veins of pegmatite, feldspar, quartz, mica, beryl and others. These veins or dikes, as they are more commonly called, are breaks in the solid rock caused by an intrusive process of an exceptionally fluid magma rich in mineralizers. The age of the pegmatite at the Ruggles mine has been estimated from the lead-uranium ratio to be 304,000,000 years. The mica-bearing pegmatite veins range in size from a fraction of an inch to large irregular masses 200 feet thick and 1,000 feet long. Chunks or "books" of thin, flexible, elastic mica up to a yard square and weighing 25 to 30 pounds apiece are extracted from the pegmatite.

Drilling and Crushing

Drilling at the Ruggles mine is done by Sullivans powered by three Ingersoll-Rand compressors. The rock breaks easily with 40 per cent dynamite. The coarse material, both mica and feldspar, in sizes one man can handle, is loaded into ½-yard buckets, which are wheeled to the open shaft on rubber-tired tricycle frames. They are raised to the surface by a 1-ton derrick with a 40-foot boom, powered by a Sullivan gasoline hoist. The deep parts of the shafts where daylight does not penetrate are lighted by four or five 50-watt bulbs strung on leads, current for which is furnished by a Delco 32-volt generator.

The large pieces of feldspar go through a Hercules-powered Good Roads jaw crusher, and then to Smith Pulsator vibrating screens of 2½, 1½ and ¾-inch sizes. Tailings, or stone smaller than ¾ inch, go to waste, while the stone from 1½ to 2½ inches is sorted and classified as to quality grade. Pieces larger than 2½ inches go through the stone crusher again for further breaking. The feldspar is hauled down the mountain in a 1½-ton Ford truck to Grafton, where it is loaded from a ramp into box cars in order to keep it clean and dry and then shipped to the buyer. Feldspar is important as the chief source of alumina used in the ceramic industry in the manufacture of glass, pottery, and enamel ware. It is also used as an abrasive in the manufacture of soap powders and cleansers.

The mica goes to a rifting plant at Gilsum where it is cut, trimmed, and classified. It is then sent to the Colonial Mica Corp. at Newport for final grading and where payment is made.

Twelve men under the supervision of Philip Brown, Superintendent, work this mine the year round for the owner, the Whitehall Co. of New York City. Last year about 15,000 tons of gross material was moved, 40 per cent of which was feldspar.

Company Road

The 12-foot-wide access road to the Ruggles mine rises 600 feet in its 1½-mile length from a connecting town road to the mine summit at 1,800-foot elevation. The road was built seven years ago and is resurfaced every year with feldspar tailings, ¾-inch stone down to dust. The 1½-ton truck simply dumps this stone on the center of the road and lets traffic spread it. The tailings break rather easily which makes for an excellent compacted surface. The thickness ranges from 8 to 24 inches. Sluices are built diagonally across the road on steep grades to check the downward rush of water in heavy rains. They consist of two 2 x 8's separated by a 2 x 6 lying flat used as the floor. The company itself keeps the road free from snow in winter with a V-plow mounted on a truck.

Work at United Mine

The United mine in Grafton is producing mica 24 hours a day with a crew of sixteen. Half of these are Newfoundlanders, brought into the country to help overcome the man-power shortage. They live at the mouth of the mine, high in the mountain, in three government trailers. Their food is brought to them once a week on Saturday nights. Some minor confusion is caused by three of these miners having the same name of John Francis Costello, though not related to each other.

Owned by the New Hampshire United Mining Co., this mine has now been operating one year and averages ¾ ton of mica a day. Drilling is done by three Ingersoll-Rand 360, K160 and 105A compressors operating two Sullivan and two Ingersoll-Rand column bar drills. Also in use are two Ingersoll-Rand JD4, one Ingersoll-Rand JD5, and two Sullivan 57 drills.

Two shafts 60 feet long enter the ground at about a 45-degree angle. Mica is hauled up these inclines in 1-yard skip cars which operate on a narrow-gage 3-inch-rail track built on 4-inch log ties laid on 6 x 6 stringers. Two Jaeger hoists pull the cars to the surface. A 1½-ton Ford truck hauls the mica to a rifting plant at Andover, where fourteen girls and two men are employed.

Subsidy to Miners

To encourage private initiative in the development of mica mines, the Colonial Mica Corp. will advance $2,500 to a prospector who feels he has discovered a likely vein. Other such grants will be forthcoming if the corporation considers the project worth while. Mica is not too difficult to locate. Bold outcrops of identifying pegmatite are prominent topographical features in the main mica belt, which follows a rough line from the southwest corner of New Hampshire north 20 degrees east to the vicinity of Campton. The pegmatites follow approximately the divide between the Connecticut and the Merrimack Rivers, in a glaciated region of wooded hills and numerous lakes and ponds where altitudes range from 650 to 2,100 feet.

At present in New Hampshire the only mining done is for these non-metallic minerals, feldspar and mica. The feldspar industry, of course, does not depend on the war for its existence. Whether the mica mining boom will continue with the peace is problematical. Competition with cheap labor will again come from India, Union of South Africa, and Madagascar. No doubt the question of barrier tariffs will arise. Additional competition may be offered by manufactured synthetic products and newly developed plastic substitutes. In the meantime the beautiful hills and mountains of New Hampshire are echoing with dynamite blasts and the whirr of miners' drills as the flaky, silvery mica is dislodged from where it has lain for millions of years.

Lubrication licks friction, prevents wear, and keeps equipment running longer and more efficiently. Choose your greases wisely and use regularly in proper amounts.

WELLMAN WILLIAMS TYPE BUCKETS

Since 1931 Wellman Buckets have combined the many special mechanical features of the famous Williams Clamshell Bucket with the construction "know-how" of The Wellman Engineering Company. For 50 years Wellman has built heavy bulk material handling equipment for steel plants and other heavy industries.

Multiple Rope and Power Arm Types • Dragline • Power Wheel • Dredging • Special Service Buckets ⅛ to 16½ Yd. Capacities.

Welded Rolled Steel Construction

FOR GREATER STRENGTH LIGHTER WEIGHT • LONGER LIFE

Welded construction, once confined to custom-built Wellman Buckets for steel mill and dredging service, is now featured in every Wellman-Williams Bucket.

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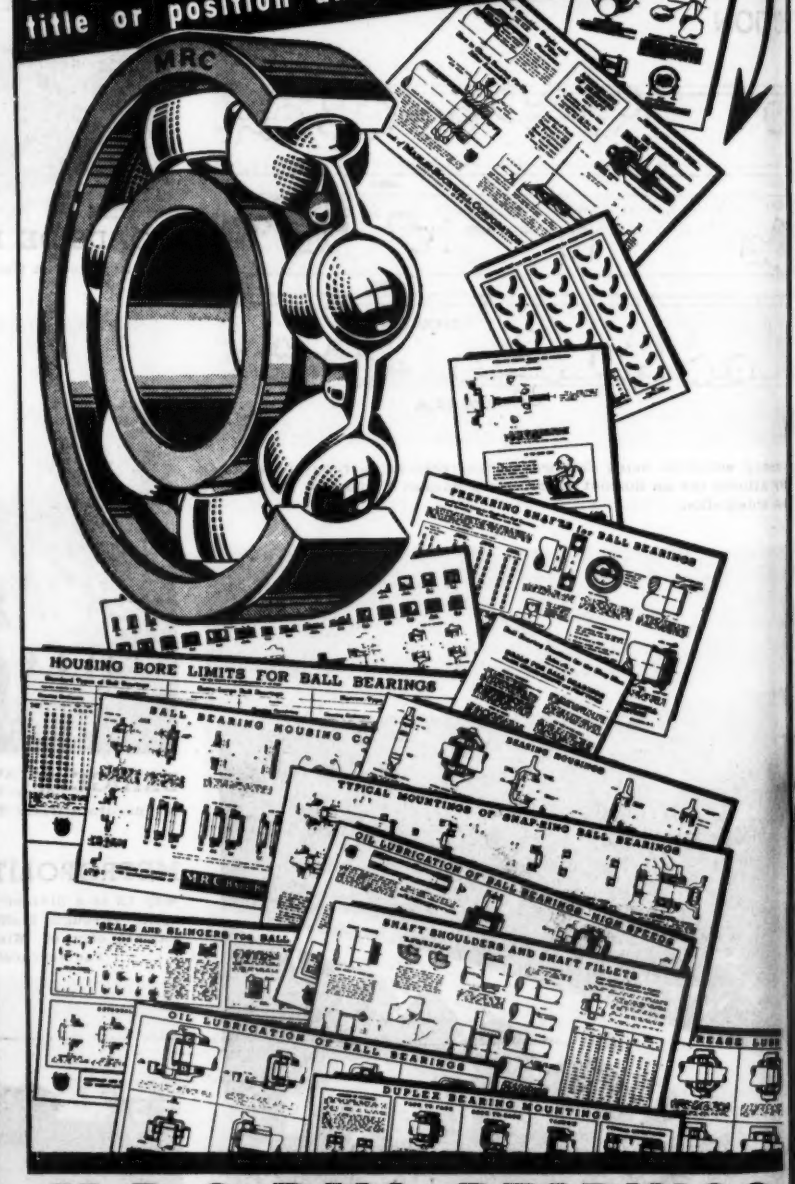
27 BULLETINS on BALL BEARINGS — their use, installation and maintenance. Available to Maintenance Men, Service Men, Engineers, Designers and Draftsmen. Sent on your request; write, giving your title or position and name of company.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PREPARING SHAFTS FOR BALL BEARINGS
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TYPICAL MOUNTINGS OF SNAP-RING BALL BEARINGS
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Executive Offices: JAMESTOWN, N. Y.

Texas Highway Shop For Equipment Care

Where Districts Are Larger Than Some Eastern States, District Shop Is Basic Unit In Organization for Repair

✦ DISTRICT 15, Texas Highway Department, located at San Antonio, performs all the upkeep of Maintenance Department equipment in a well arranged group of buildings adjacent to the District Office. Separate buildings house the blacksmith shop, paint shop, and automotive repair shop, while an outside surfaced storage area is provided for machines awaiting repairs, and emergency bridge-repair steel and timber, subject to orders from the central office at Austin for use in emergencies at any point in the vicinity.

Automotive Repair Shop

The largest unit of this group is the District warehouse and garage, a steel-frame building 60 x 130 feet in size, with sides and roof of corrugated asbestos. Steel trusses support the roof, leaving the concrete floor clear for the movement of equipment. Sliding doors 10 feet wide provide access through the south end and both sides, and from the south door and along the east side an overhead track supported by the roof trusses carries roller-mounted Yale chain hoists for handling heavy parts and assemblies.

The north half of the building, separated from the rest by a heavy woven-wire partition reaching to the ceiling, is the District stockroom which contains an office for the District warehouseman and, in the northwest corner, a 16 x 18-foot room for the storage of records of past operations. Double storage bins 8 feet high are ranged in seven double aisles and their compartments of varied sizes furnish a well arranged and adequately protected stockroom for the many items essential to the operation and repair of District equipment.

In the clear space south of the wire grill, numerous pieces of equipment undergo repair without unduly crowding the 8-foot x 16-inch South Bend lathe and the 60-ton Manley hydraulic press. A Canton portable crane is utilized for the movement of heavy equipment. A Sunnen grinder, an Armstrong-Blum power hacksaw, and a Black & Decker pedestal grinder are also ranged along the west wall. Near the south end of the west wall a King electrical test rack is available for checking automotive electrical circuits.

In the southwest corner of the building, a 15 x 20-foot wire cage encloses the shop foreman's desk and various manufacturers' special tools mounted on a board. Two sides of this wire enclosure are lined with a waist-high shelf under which are cabinets for small special tools and on which is a Sioux bench grinder and an Atlas mandrel press. A Black & Decker valve refacer is mounted on a steel rolling table.

Near the east wall of the large repair shop a Curtis compressor furnishes air for the operation of the St. Louis 8,000-pound-capacity greasing hoist and the Alemite high-pressure portable lubrication outfit which function just outside the building south of the east door. Just inside this door, a gasoline pump on the left dispenses fuel, and the washroom is on the right. A concrete wash rack is constructed just north of the east door in line with the grease rack to the south.

For normal operations the shop force consists of a District mechanic, a District warehouseman and his assistant, the shop foreman, and eight mechanics including blacksmiths and welders.

Paint Shop

To the east of the main shop is a 40 x

(*Continued on page 65*).

C. & E. M. Photo

The District 15 offices of the Texas Highway Department at San Antonio, with the historic pecan trees in the left foreground where Theodore Roosevelt took command of the Rough Riders.

DRILL
in any position
and at any angle
with the
CLEVELAND
DR30
Pneumatic tires are now unobtainable except for armed forces; DR30 Wagon Drills are regularly supplied with steel wheels only.

★ By merely loosening two nuts, the Cleveland DR30 Wagon Drill can be swung forward or back and from side to side. Then set it as you wish—straight down, flat, breast high, higher than your head, within 4" of ground level, or even straight up. • Here are a few more important features of the DR30:

★ Feed capacity over 8 feet, handles depths to over 25 feet.

★ Recoil device holds machine to its work, increases drilling speed 10-25%.

★ Forward leg point holds the drill and steel in line on all kinds of holes.

★ Centralizer keeps steel from "walking" when starting hole, prevents breakage of bit points.

★ Twin jack-screw mechanism permits easy moving of U-bar, shortens set-up time.

★ Main wheels swivel 90° for line drilling, and 180° to obtain narrower tread.

Write for Bulletin 132 that fully describes the most popular wagon drill ever built.

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LIGHT—Where you want it—when you want it.

POWER—To operate hand tools—saws, drills, hammers, etc.

Floodlight and Searchlight Units up to 14 million candlepower.

Write for Bulletin 161

LISTER-BLACKSTONE, Inc.
2706 So. 68th Street MILWAUKEE, WIS.

Surface Treatments For Mass. Highways

(*Continued from page 25*)

which requires the use of considerable labor in order to perform the work properly. With the existing man-power situation, it has been extremely difficult to secure the men needed at the time and place desired.

This difficulty is being overcome by resorting to surface treatments before the need for extensive patching occurs. In this way a minimum number of men are able to cover a considerable length of road, if the condition of the road is determined soon enough. A little closer inspection of the road surface and prompt action in arranging for the surface treatment permit a conservation in man-power and result in a smooth. well maintained surface.

Surface Treatments

The application of surface treatments to all types of roadway surfaces, both for the preservation of the surface and the provision of non-skid qualities, forms a major part of maintenance work and, as previously stated, is especially advantageous with the present man-power shortage. The next few paragraphs deal with some of the problems encountered and methods used in making surface treatments.

There are a number of pre-treatment anti-stripping compounds on the market which have certain merits for use in both patching and surface-treatment work. Most of these compounds work very well in wet weather and are, therefore, very useful in patching a bituminous-macadam surface in the spring. In making surface treatments, because of the close adhesion of the asphalt and aggregate when anti-stripping compounds are used, less stone is lost through the action of traffic, and the amount of stone may be reduced. Also, in case of a rainstorm occuring during the operation, the asphalt will still adhere to the stone.

Since most of the road surfaces of this state are of bituminous-macadam construction, it might be interesting to give a brief resumé of the surface-treatment application to this type of road. A close examination of a bituminous-macadam road needing a surface treatment reveals a honeycombed surface no longer tightly sealed against the elements. If a surface treatment is not applied, the large 2½-inch stones begin to work loose, and raveling of the surface commences.

After suitable patches have been made in areas where raveling has occurred and the road has been brought to a true cross section, either rapid-curing cut-back asphalt, Grades RC-3 or RC-4 (AASHO Specification), or asphalt emulsion, Grade RS-1 (Asphalt Inst. Spec.), or tar, Grades RT-8 or RT-9 (AASHO Specification), is applied at the rate of from 0.20 to 0.40 gallon per square yard, the rating having been previously determined by examination of the road. Pea stone of ½-inch size is spread over the freshly applied bituminous material at a rate of from 20 to 40 pounds per square yard, depending also on the previously determined condition of the road and the quantity of bituminous material used. If further refinement is considered necessary, the pea stone is spread more evenly over the surface, before rolling, by means of a strip of closely woven wire fencing 6 to 8 feet wide and 8 to 10 feet long dragged over the surface. The road is then rolled enough to insure the settlement of the pea stone into the interstices between the larger stones in the old surface and to smooth out and thoroughly compact the surface-treatment material. Too much rolling causes crushing of the pea-stone cover and should be avoided.

Another type of surface treatment or seal coat with which the Department has obtained excellent results during normal times calls for the application of asphaltic road oil, Grade SC-5 (AASHO Specification), at the rate of approximately 0.25 gallon per square yard, covered with ¾-inch pea stone. This surface treatment produces a highly non-skid surface of extreme durability, but the grade of asphalt required is extremely difficult to obtain under present restrictions.

Bridge Maintenance

The usual bridge-maintenance work is taken care of by state forces working under the supervision of the various districts. Where it is necessary to make repairs that cannot be done conveniently by state forces, the work is done under contract. Thus major repairs are often done by contract, as well as the painting of the larger steel structures.

The standard specifications of this Department designate every structure with a clear span of 8 feet or over as a

(*Concluded on next page*)

RAPIDITY!

UNIFORMITY!

SATISFACTORY!

Contraction joints *MUST* or should be installed within the "opportune" limited time of ten minutes; this requires speed and proper machinery. All Engineers know how disastrous it is to work concrete too wet or too dry.

"FLEX-PLANE" mechanical joint installers for all types of joints—ribbon, premoulded, poured, cork, rubber, etc.

Ask for Bulletin E-11; it "portrays" other things you know!

FLEXIBLE ROAD JOINT MACHINE COMPANY

WARREN, OHIO, U. S. A.

HOW A B G MIXER PROVIDES VERSATILITY

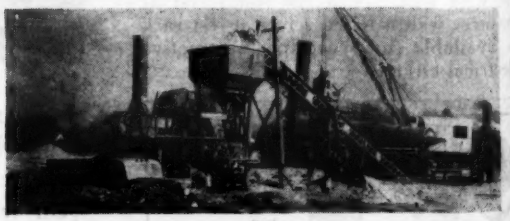
For Low-Cost Roads—
The B-G Mixer and Bucket Loader Form a Travel Plant

● High-type mix . . . intermediate mix . . . low-cost road mix! There is a combination of B-G units to make a plant set-up for producing bituminous mixtures under any specification, without employing unnecessary, costly units.

Just couple the Mixer to a B-G Bucket Loader and you have a travel plant that injects high quality into low-cost roads—an outfit that maintains a steady output of *plant-mixed* material mile after mile.

For the production of a wide range of intermediate bituminous mixes, team up the same B-G Mixer with a Dual Drum Dryer. To the accurate proportioning of the Mixer is now added drying to the previously-sized aggregate.

When high-type mixes are needed, add a B-G Gradation Control Unit to the same Mixer and Dryer. Now the plant gives you complete control of aggregate sizing, gradation and moisture control . . . meets most rigid specification requirements . . . yields a constant stream of absolutely uniform mix. For complete information on this versatile equipment, write the Barber-Greene Company, Aurora, Illinois.



For Intermediate Mixes—
The B-G Mixer Is Teamed Up With a Dual Drum Dryer

For High-Type Mixes—
To the Mixer and Dryer Is Added the B-G Gradation Unit

44-12

Barber-Greene B G *Constant Flow Equipment*

Bridge Maintenance By Bay State Forces

(*Continued from preceding page*)

bridge. There are about 700 structures for the maintenance of which the Department is either entirely or in part responsible. About 650 of these are our direct responsibility and the remaining 50 are railroad bridges for which the Department has been ordered to assume some share of the maintenance.

These bridges represent an original investment of about $17,000,000, based on the actual cost of 248 of the more recent structures and a conservative estimate of the cost of each of the remainder.

On the basis of total length, they may be classified as follows:

8 to 20 feet inclusive	260 bridges
20 to 50 feet inclusive	242 bridges
50 to 100 feet inclusive	112 bridges
100 to 200 feet inclusive	58 bridges
200 to 300 feet inclusive	11 bridges
Over 300 feet	17 bridges

Included in the above are 190 bridges having exposed structural steel. These were erected at a cost of approximately $10,000,000 and include the five drawbridges which the Department operates, and which are described briefly below.

The New Bedford-Fairhaven Bridge, completed in 1898, has an electrically driven rim-bearing swing span and hydraulic end lifts. The Newburyport-Salisbury Bridge, which was completed in 1902, has a through-truss electrically driven rim-bearing swing span with toggle-type end lifts. The Fall River-Somerset-Brightman-Street Bridge has a double-leaf Scherzer-type lift span and was built in 1908. The Fall River-Somerset, Slade's Ferry, Bridge has a single-leaf plate-girder Scherzer-type lift span built in 1938. It is the only one of the five not equipped with traffic lights and mechanically operated gates. The traffic gates on this bridge are manually operated. The Quincy-Weymouth Bridge over the Fore River has a double-leaf Scherzer-type lift span completed in 1936.

An indexed system of records for state highway bridges has been set up. Each district is supplied with similar records for the bridges within its jurisdiction. Costs and a description of work done are kept and these, together with inspection reports, become a performance record from which it is possible to supply information to the Bridge Engineer on design detail.

The vast majority of the work is to preserve the original strength and appearance of the structures. On that part of the work which involves change in members or affects the capacity, the Bridge Engineer is consulted or the project turned over to him for design.

One of the critical materials needed in connection with both bridge maintenance and ordinary maintenance is paint. Some difficulty has been experienced with this important maintenance material because of the Federal order curtailing the use of linseed oil. A change in Massachusetts specifications to permit the use of replacement oil has resulted in paints which, although not as good as we would ordinarily use, are working out very satisfactorily.

Methods May Change

With the continuing shortages of critical materials and the induction of still more men into the armed services, it is expected that further wartime modifications in methods of repair and maintenance will be required.

Guide to Federal Agencies

So many contractors and officials, businessmen and individuals are today seeking information from or about the 34 "Bureaus", the 46 "Offices of", and the 42 "National" groups connected with the Federal government that we believe many of our readers will be interested in the 68-page "Federal Agencies—A Descriptive Tabulation of 428 Functional Units of the Federal Government" which has recently been issued as Publication No. 333 by the Citizens National Committee, Inc., 1409 L St., N. W., Washington 5, D. C., at 25 cents a copy.

This tabulation is designed to provide enough accurate information to launch anybody into consideration of what bureau, office, or agency he should get in touch with regarding his business or interests. To that end it provides the name, a description of the function, the method and year of creation, and the appropriation, and estimated average personnel for each of the agencies listed, as of June 30, 1944.

In addition, agencies are listed to show "parentage", who works for and under whom. The "children" are listed, whether they receive direct appropriations or operate with the funds or personnel of other agencies. In most cases, the exact source of the agency's authority is given, whether statute, executive order, or some other method of creation.

Heavy-Duty Trucks For Contractor Use

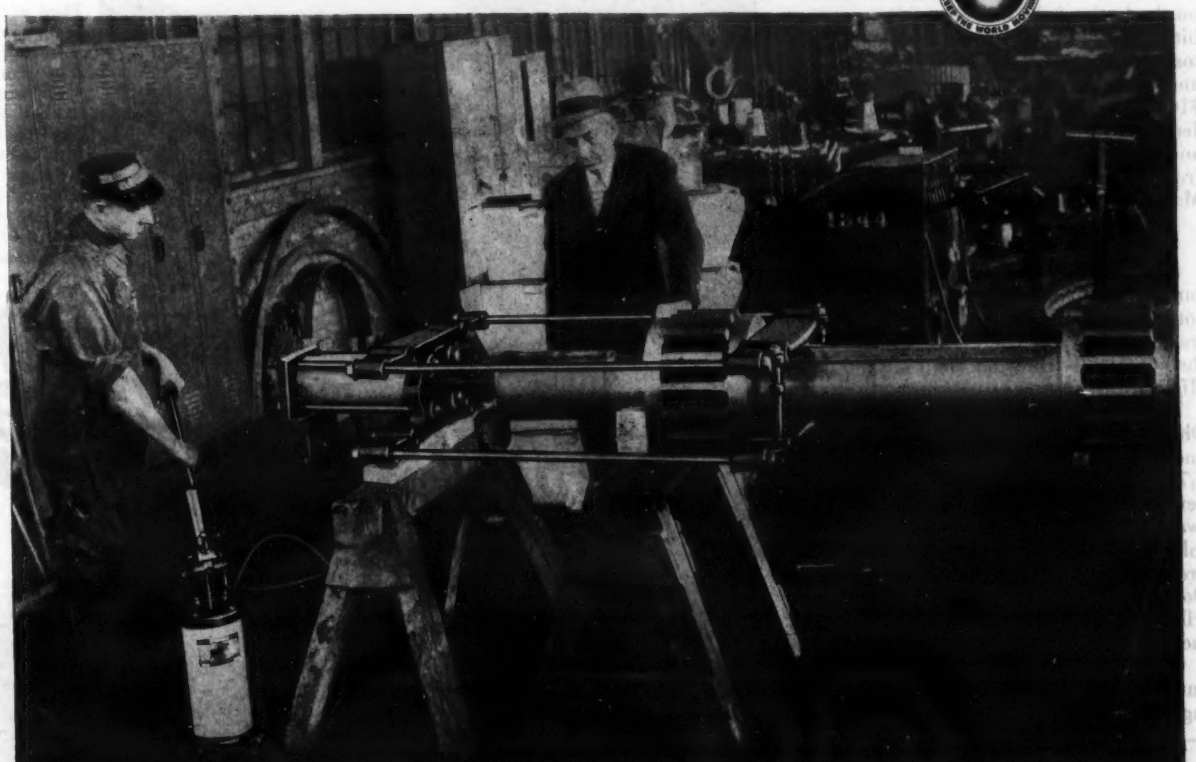
A 2-ton heavy-duty dual-purpose truck with a 120-hp engine, made by the Dodge Division, Chrysler Corp., 7900 Jos. Campau St., Detroit 31, Mich., is described and practically taken apart in pictures in a new folder which should be in the hands of every contractor who is giving thought to replacing his worn-out trucks or adding to his fleet for the coming post-war construction period.

Copies of this bulletin, as well as one with similar features on Dodge 1½-ton trucks, may be secured direct from the manufacturer by mentioning this news item. Ask for folders DMA 4972 and 4969.

Engines FROM 90 to 215 HP. Generators FROM 60 to 115 KW
More Power
MURPHY DIESEL
More Profit
MURPHY DIESEL COMPANY, 5319 W. Burnham St., Milwaukee 14, Wis.

NO. 22 OF A "READY-WITH-A-RODGERS" SERIES

HYDRAULICS Rodgers KEEPS THE WORLD MOVING



"Talk about fast work . . . our RODGERS PRESS pulled both gears in just 18 minutes"

"Pulling gears from a shovel shaft used to be a 12-hour grind before we got our Rodgers Universal Press. It meant dismantling our big shop press and reassembling it around the shaft... a job we had to do twice, to get at both gears.

"With the Rodgers, we now pull those same gears in 18 minutes. Your portable press has streamlined this operation . . . and that's just one way it is saving us time and money."

This experience was reported to us by one of the top manufacturers in the equipment field . . . is typical of many others describing the economical performance of the all-purpose Rodgers Universal Press. *Get complete information and prices today. Write or wire Rodgers Hydraulic, Inc.,* 7415 Walker Avenue, St. Louis Park, Minneapolis 16, Minn. *"If it's a Rodgers, it's the best in Hydraulics."*

Uses for RODGERS UNIVERSAL HYDRAULIC PRESS
Gear Pulling • Wheel Press Work • Jacking Pipe • Erecting Machinery • Relocating Machinery • All-Purpose Jack

RODGERS HYDRAULIC, Inc.

Non-Skid Surfacing For Michigan Road

Tar and Stone Chips Used On 14-Mile Contract Near Monroe; Speedy Job With 3-Mile a Day Average

✦ THE 14 miles of Michigan's state trunk highway M56 northeast of Monroe have recently been given a non-skid surface treatment of tar and stone chips as a part of State Highway Commissioner Charles M. Ziegler's resurfacing program. This 20-year-old concrete pavement, in the southeast corner of the state almost bordering on Lake Erie, with variable widths of 16, 18 and 20 feet, had been given a similar treatment two years ago. By repeating this process at regular intervals, a smooth-riding skid-proof surface is provided which utilizes the old cracked concrete pavement as a base.

The contract for this work was awarded to the W. H. Knapp Co. of Monroe, Mich. The contractor was paid on the basis of the number of gallons of bituminous material and the number of tons of stone distributed on the road, and the total contract price was about $16,000. The tar was furnished by the Jennison-Wright Corp., Toledo, Ohio, and distributor equipment was obtained from the Schoen Asphalt Paving Co. of Monroe, Mich.

Applying the Tar

Before the tar was applied, the road surface was carefully swept clean by a rotary broom mounted on a Farmall tractor. This sweeper was rented by the contractor from the Monroe County Highway Department.

The T-9 tar was hauled from Toledo, Ohio, 35 miles to the south, in two truck-and-trailer transports holding 4,900 and 4,700 gallons respectively. The temperature of the tar was maintained between 200 and 250 degrees F. At the job site, the tar was transferred to a pressure distributor, mounted on a Dodge truck, by the pump on the distributor. The tar was usually applied to the road at a temperature of 215 degrees F which was maintained by the two oil burners on the distributor. Each morning before the start of the day's run, the spray-bar nozzles were cleaned with fuel oil and any faulty nozzles replaced with new ones. The tar was applied at a pressure of 25 pounds through a 10-foot spreader bar at the rate of 0.3 gallon to the square yard. The rate of flow was checked by a tachometer on the distributor which showed 555 rpm for this particular application.

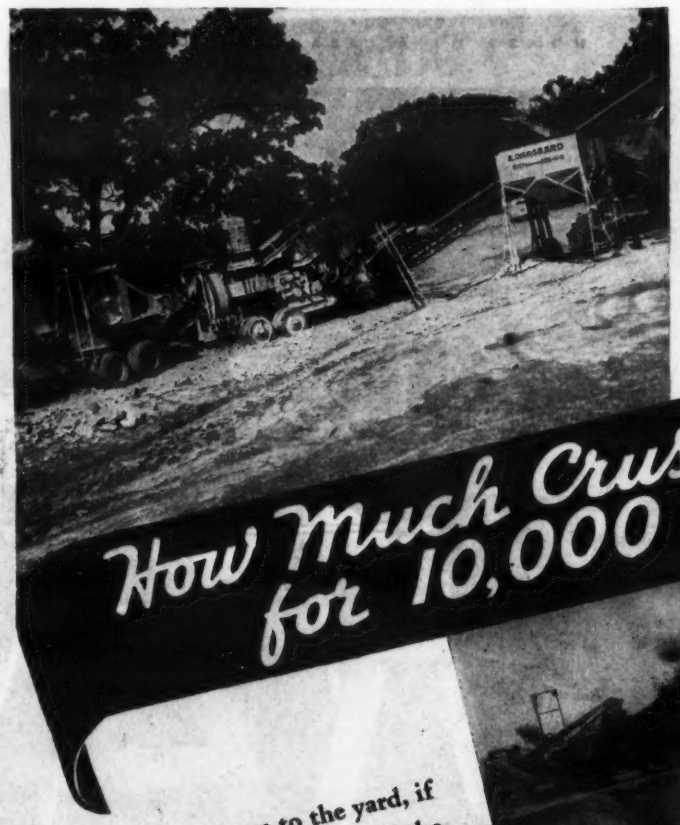
Half the width of the road was sprayed at a time, as traffic had to be maintained on the other half. The procedure was to apply half the load of the distributor at a time and then wait for the stone spreader to catch up. The distributor covered 2,400 feet of half-width paving at one filling and applied its 800-gallon load in 15 minutes. Precautions were taken to prevent fat spots or double tarring by placing a piece of roofing paper 3 feet wide and 10 feet long over the end of the previous application, thereby catching the surplus from the spray bar as the distributor started a new shot.

In surfacing this 14-mile road, half the width of a 5-mile section was done first and the other half was done next. This method was repeated on the next 5-mile stretch of pavement and then on the remaining 4 miles. In this way the equipment was not unduly spread out

(*Concluded on page 77*)

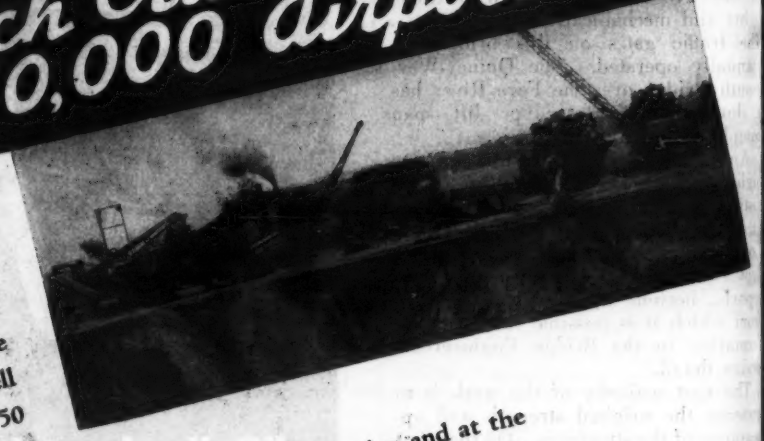
C. & E. M. Photo

Crushed gravel for a non-skid surface on Michigan Trunk Highway M56 was applied by a Buckeye spreader at the rate of 30 pounds per square yard.



These two Universal Crushing Plants are supplying crushed rock for the Rock County, Wisconsin airport (Class IV) near Janesville, Wisc. Plant at left, owned by Art Overgaard, Elroy, Wis., consists of 546-P primary unit with 20″ x 36″ jaw crusher and secondary unit with 30″ x 18″ crushing rolls, double deck screen, rotovator and conveyors. Plant below owned by Rock Road Construction Company, Chicago, consists of two complete plants in tandem—one with 10″ x 36″ jaw crusher, double deck screen and conveyors and one with 40″ x 22″ crushing rolls and 2¾ deck screen, rotavator and swivel conveyor. Over 200 yds. per hr. of 1″ material are produced.

How Much Crushed Rock for 10,000 Airports?



We could tell you to the yard, if we knew the size of each and the specifications. We could also tell you which of the more than 50 Universal Portable Crushing, Screening and Loading Plants would turn out the crushed rock or gravel faster to specification and at the lowest cost per yard. Ten thousand is a lot of airports, but it would not take Universal plants very long to pile up the material needed for them. Scores of Universals are now providing landing field materials for the South Pacific Islands retaken from the Japs. There'll be a lot of airports built after the war — how many, we're not sure — but, if you figure on furnishing the crushed rock for any of them, why not check with your Universal dealer? He may have some helpful suggestions.

UNIVERSAL ENGINEERING CORP.
620 C Avenue West
Cedar Rapids, Iowa

UNIVERSAL
CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

Start Post-War Planning Now!

»For HOSE BOOTS, CLOTHING or PUMP DIAPHRAGMS

Call YOUR Continental BRANCH

Immediate Delivery from Local Stock

BRANCHES

Baltimore	Kansas City
Boston	Los Angeles
Buffalo	Memphis
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Cincinnati	New York
Cleveland	Philadelphia
Dallas	Pittsburgh
Dayton	Rochester
Detroit	San Francisco
Indianapolis	St. Louis

CONTINENTAL RUBBER WORKS
ERIE, PENNSYLVANIA, U.S.A.

Maryland Prepares For Future Highways

(*Continued from page* 10)

of having completed field studies for approximately one-half of the remainder of the program, of which about 10 per cent has progressed to the stage of completed plans.

All of the available construction engineering personnel has been assigned to the work of making surveys and preparing plans in order to restore at least a part of the depleted personnel of the Department of Plans and Surveys, which because of the war has dropped to about 35 per cent of its original number of employees. Because of this loss in trained personnel, no definite rate of progress can be established for the preparation of plans and the acquisition of rights-of-way. It might be stated, however, that because of the very material reduction in available funds and the probability of the very necessary improvements being extended over a greater period of time than the three years originally contemplated, the available engineering personnel will likely be able to dispose of all preliminary engineering work as rapidly as the requirements demand.

Contractors Are Ready

Recent estimates would indicate that the financial status and equipment inventory of Maryland contractors would permit $45,000,000 of construction annually. The release of these contractors and their equipment from projects essential to the conduct of the war and the release of workers from the armed forces and the war production centers will insure a normal procedure in the construction of the program.

Standard Oil of Indiana Announces Officer Changes

Several major changes have been announced in the top management of the Standard Oil Co. of Indiana and its subsidiaries, to become effective January 1, 1945. On that date Edward G. Seubert will retire from the presidency after serving the company more than fifty-two years and heading it as chief executive more than fifteen. He will remain a director and become Chairman of the Executive Committee of the Board.

Robert E. Wilson, now President of Pan American Petroleum & Transport Co., will return to Chicago to become Chairman of the Board and chief executive officer of the Indiana company; A. W. Peake, at present a Vice President, will advance to the office of President. His place will be filled by F. O. Prior, now President of Stanolind Oil & Gas Co., an oil producing subsidiary. Mr. Prior will be a director and Vice President of the Indiana company and also Chairman of the Board of the Stanolind Oil & Gas Co., Stanolind Pipe Line Co., and Stanolind Oil Purchasing Co., as Mr. Peake has been. Mr. Wilson will take over Mr. Seubert's responsibilities as Chairman of the Board of Pan American Petroleum & Transport Co., Standard's eastern subsidiary.

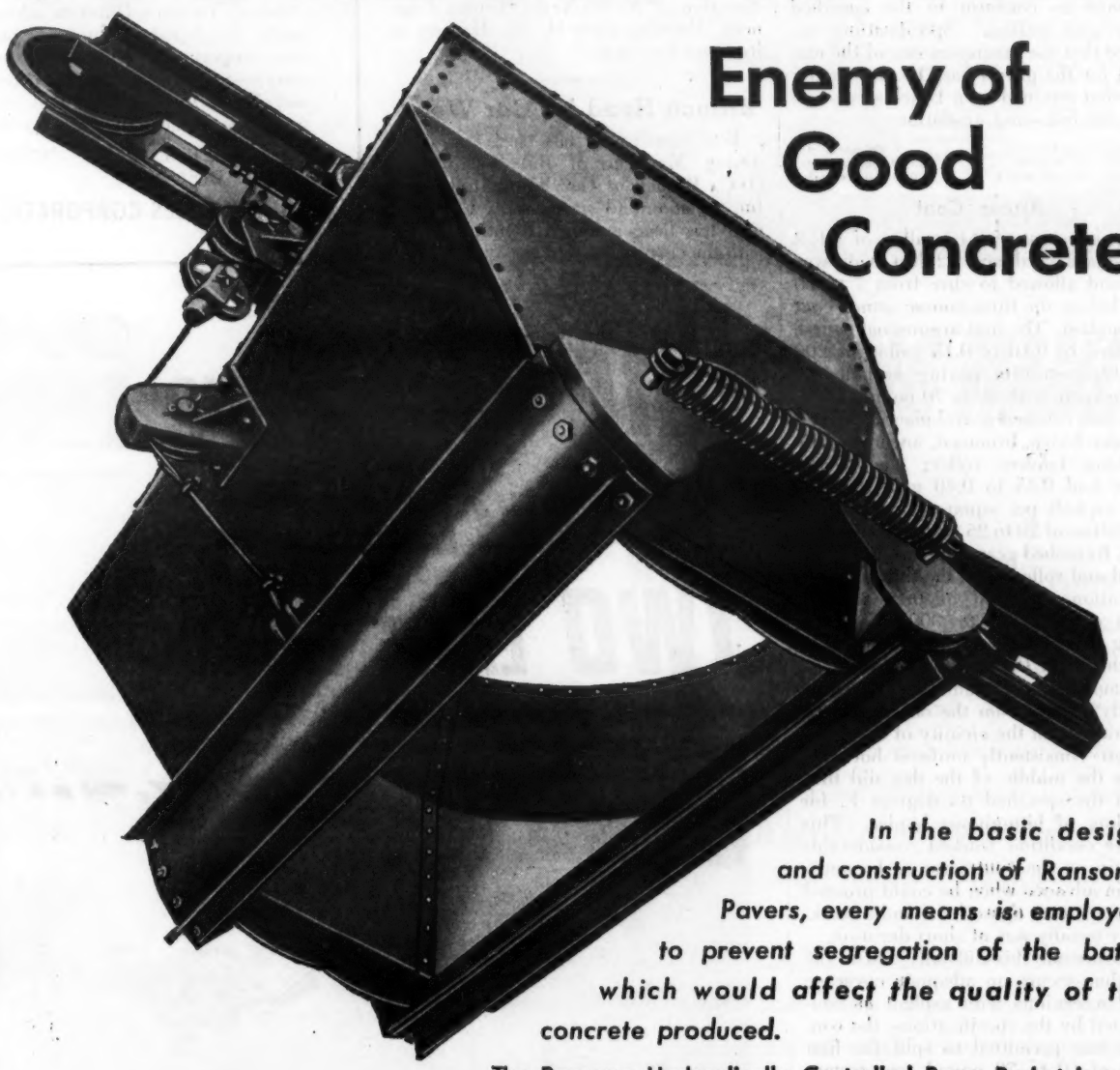
For Mr. Seubert personally, the change will top off a unique career that began only two years after the company was organized, saw him advance from a mechanic's helper to a seat on the board and officer's status in 1919, put him in the presidency in 1927, and made him chief executive in 1929. He has been President of Standard of Indiana longer than any predecessor.

Van Keppel to Sell Euclids

The appointment of the G. W. Van Keppel Co., 2440 Pennway, Kansas City, Mo., as authorized Euclid distributor for Kansas and western Missouri has been announced by The Euclid Road Machinery Co., Cleveland, Ohio. In addition to Euclid equipment, the company distributes a well-rounded line of construction machinery. G. W. Van Keppel, head of this distributing organization, is President of the Associated Equipment Distributors.

SEGREGATION...

Enemy of Good Concrete



In the basic design and construction of Ransome Pavers, every means is employed to prevent segregation of the batch which would affect the quality of the concrete produced.

RANSOME 34E SINGLE AND DUAL DRUM PAVERS ARE HYDRAULICALLY CONTROLLED!

The Ransome Hydraulically Controlled Boom Bucket is provided with gates that slide out of the path of the concrete when the bucket is discharging, giving it full unimpeded flow to the subgrade. The bucket gates can be opened to any degree permitting good spreading action, or dumping of part of the load thus eliminating split batches.

This is but one of many important features found only on Ransome Pavers. On your next paving job, use a Ransome. . . . We will be glad to give more reasons why you should.

CONSTRUCTION EQUIPMENT DIVISION Ransome MACHINERY COMPANY
DUNELLEN, NEW JERSEY
SUBSIDIARY OF WORTHINGTON PUMP AND MACHINERY CORPORATION

Water Seasoned AS THE "MARS"

Designed for special service and tested under most gruelling conditions Owen Dredging Buckets have proved to be uncommonly efficient and durable for difficult under-water operations.

THE OWEN BUCKET CO.
6030 Breakwater Ave., Cleveland, O.
Branches: NEW YORK - CHICAGO - PHILADELPHIA - BERKELEY, CAL.

OWEN BUCKETS A MOUTHFUL AT EVERY BITE

FOR SALE
Locomotives

4 Plymouth, 3-ton locomotives, 36" gauge; type 2, Model AL. Good condition. Attractive price.

Boilers

Three 150-HP Walsh-Weidner HRT boilers, 150-lb. pressure. Save on these.

All the above located at Kansas City. For further information, write, wire or call

Sonken-Galamba Corp.
Kansas City 18, Kans.

Weather Difficulties On Resurfacing Job

(*Continued from page 21*)

tained from pumps set on the edge of a nearby lagoon. After spreading, each course was rolled by rubber-tired rollers, with the final compaction by a Hercules 12-ton 3-wheel roller. Successive courses were applied as needed until a compacted depth of variable thickness was obtained to conform to the specified grade and section. Specifications required that the maximum size of the material for the gravel base be not smaller than that retained on a 1-inch sieve, and have the following gradation:

Passing a 2-inch screen	100 per cent
Passing a No. 4 screen	25 to 60 per cent
Passing a No. 200 screen	0 to 8 per cent

Armor Coat

A prime coat of 0.17 gallon of MC-2 per square yard and 22 feet wide was shot and allowed to cure from 7 to 20 days before the three-course armor coat was applied. The first armor-coat course consisted of 0.10 to 0.15 gallon of 200 to 300-penetration paving asphalt per square yard, with 60 to 70 pounds of ¾ to ⅜-inch crushed gravel placed through spreader boxes, broomed, and rolled by a 12-ton tandem roller; the second course had 0.35 to 0.40 gallon of the same asphalt per square yard with an application of 20 to 25 pounds of ⅜-inch to No. 6 crushed gravel spread, broomed, bladed and rolled; and the third or final application consisted of 0.15 to 0.20 gallon of the 200 to 300-penetration paving asphalt and 12 to 16 pounds of ¼-inch to No. 10 crushed gravel.

Because of fog and a prevailing westerly breeze from the ocean, the air temperatures in the vicinity of this project were consistently uniform but only during the middle of the day did they exceed the specified 65 degrees F. for spreading of bituminous binder. This weather condition worked considerable hardship on the contractor as he never knew in advance when he could proceed with armor-coat operations, and a working day usually was of short duration.

To overcome this difficulty and at the same time secure an adequate coverage of the screenings with asphalt as contemplated by the specifications, the contractor was permitted to split the first course of 60 to 70 pounds per square yard of ¾ to ⅜-inch screenings into two courses and penetrate each with from 0.16 to 0.20 gallon of asphalt per square yard of surface.

Because of the smaller quantity of stone, the specified blading of each course was not feasible, but to secure a suitable leveling of the stone the contractor used a steel broom attached to the full length of the grader moldboard. The grader in turn pulled a conventional drag constructed with sections of steel broom.

This procedure permitted work to continue at temperatures as low as 50 degrees F. and, much to the surprise of everyone, the riding qualities of the pavement were improved to a remarkable degree. In fact, the roughness per mile as measured by the roughometer was found to be as low as 15 inches on sections, which compares favorably with the best riding pavements of any type.

Major Quantities

The major quantities for this 9-mile job which was made up of several scattered sections, the longest being 6½ miles, included the following:

Apply water, from source developed by contractor	1,212 M-gals.
Scarify and reshape existing surface	123 stations
Imported base, gravel	41,512 cu. yds.
Liquid asphalt, MC-2, prime	121 tons
Sand covering, for blotting prime coat	447 cu. yds.
Paving asphalt, 200 to 300-penetration	354 tons
Screenings, for armor-coat	5,546 cu. yds.

Personnel

This contract for repairs to U. S. 101 in northern California was awarded in July, 1943, for the low bid of $151,515 to Marshall M. Hanrahan of Redwood City, Calif., by the California Division of Highways, with 105 working days allowed for its completion. Due to the short working season in this particular section of California, work was suspended during the winter of 1943-44 and the job completed in the summer of 1944. Ted Y. Johnson was General Superintendent for the contractor, with Sam Ball as Superintendent on the base operations. For the California Division of Highways, the work was under the direction of A. M. Nash, District Engineer, Eureka, with H. M. Hansen as Resident Engineer.

Branch Head for Gar Wood

Roy Schoonfield has been appointed Acting Manager of the Washington, D. C., Branch of Gar Wood Industries, Inc. Schoonfield succeeds A. E. Heath who has been assigned to other duties with the corporation.

For Extra Speed!—Extra Safety ON WINTER CONCRETE JOBS

Use ▸ SOLVAY CALCIUM CHLORIDE

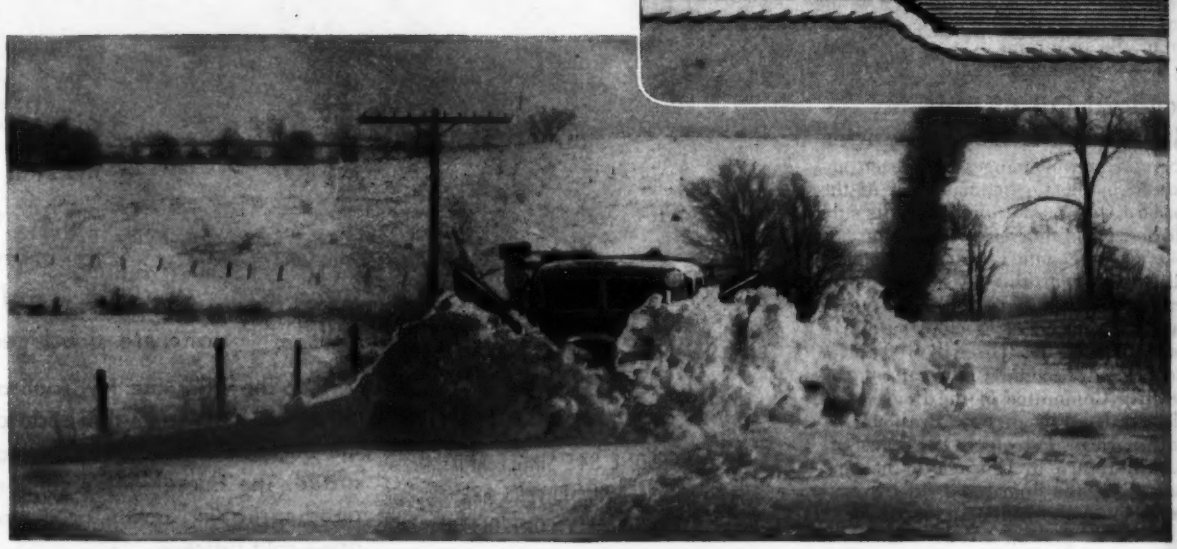
Save time on concrete construction work this winter . . . *despite* low temperatures! Costly waits between operations can be cut . . . the protection period can be reduced.

Solvay Calcium Chloride added to the mix doubles the strength normally developed during early periods . . . overcomes slowing effects of low temperatures . . . provides extra cold weather protection . . . permits re-use of forms and quicker finishing and use of concrete. It does not change the normal chemical action of portland cements and makes for a denser, stronger, more waterproof concrete.

Send for FREE booklet—"Calcium Chloride and Portland Cement." Address Dept. 94-12.

SOLVAY SALES CORPORATION, 40 Rector Street, New York 6, N.Y.

One ROUND TRIP CLEARS A Two LANE ROAD



You'll revise your estimates of equipment performance when you see the Walter 250 h.p. Snow Fighter in action! Measuring 28 ft. across with both wings down, this rugged unit pushes steadily through deep drifts on its opening run—returns with wings set to the widening position, to clear the roadway completely *in one round trip!*

Super power and traction enable the Walter 250 h.p. Snow Fighter to mount the biggest, most efficient plowing equipment—give it the speed to clear more miles of snow per hour. Snow is removed before it packs and freezes into dangerous ruts. Main highways are completely widened-out in time to clear more miles of secondary roads. Cost-per-mile comes down as snow-removed-per-hour goes up!

Unmatched tractive power is supplied by the exclusive Walter Four-Point Positive Drive. Power is proportioned to each of FOUR driving wheels according to its traction at any instant. No wheel-spinning, side-slipping, or stalling to reduce speed of clearance. There's a Walter Snow Fighter to fit every snow removal need, every snow removal budget. Write today for the complete story.

WALTER MOTOR TRUCK COMPANY
1001-19 IRVING AVE., RIDGEWOOD 27, QUEENS, L. I., N. Y.

An Isaacson Klearing-Dozer on a Caterpillar D7 clearing right-of-way for the Olympic Peninsular Navy Railroad.

Heavy-Duty Blades For Land Clearing

The first operation facing contractors on many highway, airport, railroad, dam and other construction projects is that of clearing the site of brush, stumps and boulders. A heavy-duty blade, particularly designed for this service and known as the Klearing-Dozer, is made by the Isaacson Iron Works, P. O. Box 3028, Seattle 14, Wash., for use on all types of heavy-duty tractors.

This Klearing-Blade, used in the Isaacson Trac-Dozer frame, combs out rocks, roots, stumps, brush and small trees, leaving the valuable leaf mold and topsoil intact, the manufacturer states, and rough-levels the ground, ready for disking. The weights of these blades vary from 2,000 and 3,500 pounds, depending on the size. Their construction is rugged, in keeping with the type of service for which they are designed.

A Splitter-Tooth blade is also available for use on land-clearing jobs. This is a sturdy steel tooth which can be pushed into the larger stumps, opening a crack which will split as the rear of the tractor is wheeled around. It can also be used as a high pushing point for leverage when felling trees.

Form MD-LC2, describing and illustrating these land-clearing blades, is yours for the asking. Just write to the manufacturer and mention this illustrated item.

Contractors' Manual On Public Relations

A 24-page manual on the building of public good will has been published under the title "Good Public Relations for the General Contractor" by the Associated General Contractors of America as part of its public relations program for the general contracting industry. Printed in three colors and illustrated with pointed and humorous sketches, the booklet contains a public relations chart, sample advertisements for use by contractors, and suggestions for project signs and posters to be used by contractors. There are numerous examples in the manual to show how public relations can be made good, creating a merited good will. These include advertising, which is declared to be an essential part of any sound public relations program.

The manual places emphasis on the fact that good will must be accumulated bit by bit, impression by impression; that public good will must be earned and cannot be bought; and that it is a business asset on which both money and effort can be well spent. The theme of the manual is expressed in its opening paragraphs, which state:

"Recognition of the need for good will of the public and a determination to merit that good will are essential basic elements in any public relations program.

"For the general contractor, public good will is obtained through straightforward, honest and considerate dealings with everyone with whom he comes in contact in his operations."

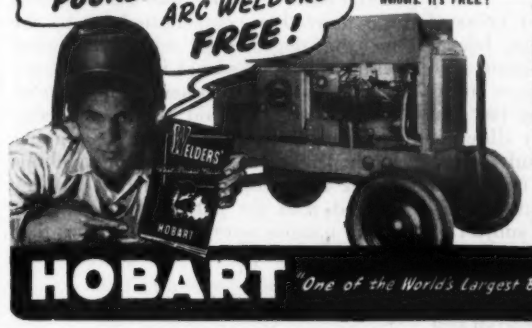
This manual, which was prepared for the Associated General Contractors of America by Campbell-Ewald Co., Inc., of New York, should be in the hands of every contractor in America. Copies may be secured at $1.00 each by writing direct to the headquarters of the AGC, 1227 Munsey Bldg., Washington, D.C.

State-Controlled Roads Total Half-Million Miles

Figures released by the Public Roads Administration show that 560,231 miles of rural roads and urban extensions were under state control in 1942. This total falls into the following classifications: primary state highway system, 334,033 miles; secondary state highway system, 83,524 miles; county roads under state control, 115,107 miles; urban extensions of state highway systems, 27,567 miles.

The states controlled 463,420 miles of surfaced rural roads and urban extensions, according to the PRA statistics, with an additional 3,281 miles of connecting streets not under state control. Surfaced, primary, secondary and county roads under state control totaled 436,428 miles, and surfaced urban extensions of state highway systems under state control amounted to a total of 26,992 miles.

HOBART "Simplified" WELDERS SAVE You Hours and Material


GET YOUR HANDY POCKET GUIDE FOR ARC WELDERS FREE!
A small, handy book with charts, tables and other information for welders. It's FREE!
WELDERS
HOBART

You too, can save time and money by adding more Hobart Gasoline Driven Arc Welders to your present list of equipment!

The most universal piece of equipment to be had. Not only is it a "MUST" for your metal construction work, but is invaluable for the maintenance of other equipment. Can also be used for the demolition of metal work, plus hundreds of other applications. Write us today for full particulars and how arc welding can be used effectively on your work.

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Roads and Drains Planned by Town

North Hempstead, New York, Highway Dept. Finds Road Maintenance and Drainage Most Important Items

✦ TO say that there are many miles of roads in Nassau County, Long Island, N. Y., is a gross understatement. So great is the network of highways covering this populous county lying just east of New York City that many different highway organizations, each with its own particular work to do, are employed. Nassau County is divided into three towns, North Hempstead, the subject of this article, Hempstead, and Oyster Bay, each of which has its own town highway department maintaining and building town roads. Several of the incorporated villages within these towns have their own adequate highway units for paving local streets and roads. Next above the towns is the Nassau County Highway Department which looks after the county roads, while District 10 of the New York State Division of Highways with headquarters at Babylon looks after all state highways in Nassau County as well as those in Suffolk County.

North Hempstead Organization

The Town of North Hempstead has an efficient well organized highway department of which Arnold P. Kohler is Superintendent, with headquarters at Manhasset. For the past nineteen years Mr. Kohler has directed the construction and maintenance of roads and drainage structures which serve this township of over 100,000 population living in an area of 59.7 square miles. The Highway Department budget for 1944, according to Mr. Kohler, is $347,000. This sum has been used primarily for labor and material in the maintenance of the town's 175 miles of roadway. New road work in the Town of North Hempstead must wait until after the war.

The town is subdivided into six highway districts, with a general maintenance foreman in charge of a crew of from seven to fifteen men. A total of sixty-nine are now employed, although prior to the war the Department had over a hundred men at work. Motor-driven equipment in use includes two Adams, one Austin-Western, one assembled motor grader and two Cletrac tractors which perform such various functions as grading, removing snow banks in winter, and general bulldozing operations. The town owns five trucks of various makes and sizes, and hires up to thirteen 1½-ton trucks for use in the various districts.

Care of Roads

The 175 miles of town roads are classified as follows:

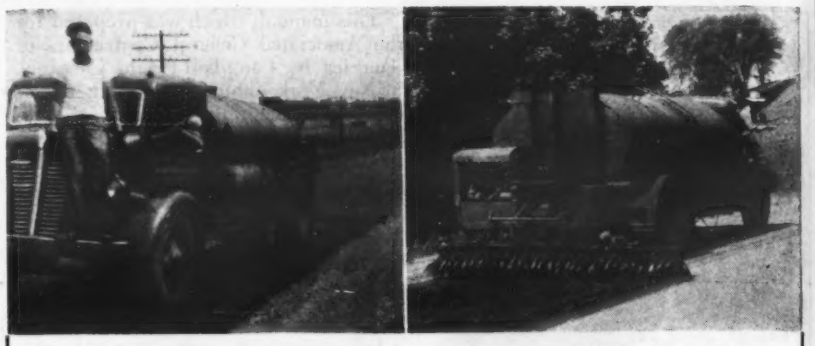
Reinforced concrete	25
Bituminous concrete	19
Bituminous macadam	16
Stabilised bituminous surface	115
Total	175

The last item covers a great variety of bituminous surfaces on broken-stone and gravel roads. A typical example of a low-cost yet satisfactory town-road surfacing in North Hempstead consists of cut-back asphalt, from ¼ to ½ gallon per square yard, with a thin covering of stone chips, which sets up within 24 to 48 hours.

Patching, naturally, is one of the large items in the town's maintenance program. For the past two years adequate road metal was difficult to obtain, and resort was made to second-rate material such as cinders and gravel from old or abandoned road beds. Better grades of broken stone and gravel are now available so that more durable patching jobs can be done.

In discussing patching, Mr. Kohler said, "Some nineteen years ago, when I first took charge of this department, it was the custom to mix tar and ¾-inch stone in place. This, I found, was very unsatisfactory, and in 1927 I experimented with a Kentucky rock asphalt under the trade name of Kyrock and found this more satisfactory and continued to use it until 1937 when a state mix had been developed that could be handled throughout the year. While the initial cost of Kyrock was high, the cost was more than compensated for by the fact that the material could be handled without heating, except in the very coldest weather, would adhere to any type of surface, could be laid to a feather edge and was compacted after a light tamping by the traffic passing over it, thus eliminating the necessity for carting a roller around with the patching gang except where patches were of such an area that the surface required evening off with a roller."

(*Concluded on page 70*)



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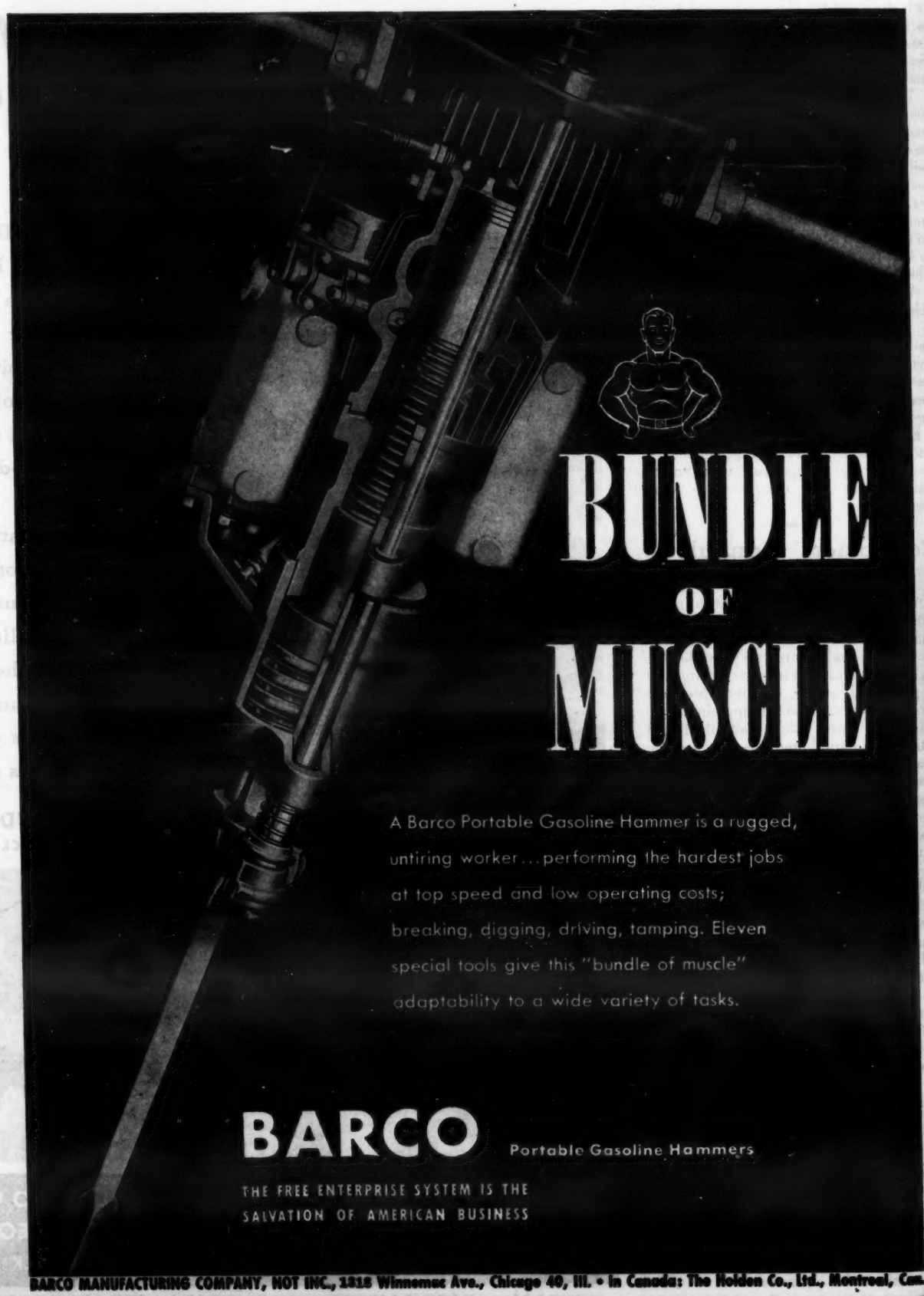
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Consider Expansion In Planning Airports

(*Continued from page* 35)

usually has its beginning as a series of one-story units interconnected to each other and to the central public building. It expands as a one-story group of buildings until such time as the traffic demands a separation of passenger and cargo handling at different levels. When this point is reached, the unit terminals are increased to two stories, raising the public observation deck one floor. The passenger service is then located on the second floor and the entire ground floor is occupied by the cargo operation and air-line offices. Many airports will be ready for this stage of the plan immediately after the war, while others may reach it after a period of operation using the single-story development.

The decentralized terminal is economical, permitting progressive growth, as business requires, by the addition of inexpensive units and not requiring major revision even when the traffic increase is sudden. However, the plan must be started in an area large enough to permit satisfaction of this demand, and wise planning will allow an area around the public center for expansion by starting the first air-line units a sufficient distance away.

Plan for Expansion

The extent to which a city will go in the development of its airport terminal will depend to a large degree upon the size of the community, the traffic handled, and the extent to which the airport is made a rendezvous for the public. It is Mr. Heino's belief that the airport of the future will be a community in itself and offers an opportunity for design on the grand scale. Wise planning and control of its development will enable every community to achieve a unified simplified group of buildings from a small beginning.

Bay State Cleans Up All Hurricane Damage

The damage to state highways in Massachusetts by the hurricane of September 14, 1944, amounted to about $250,000, most of which was on Cape Cod east of the Canal. There, a large number of trees were uprooted, some washouts occurred on the highways, and one bridge was washed out, with minor damage to several other bridges.

To aid in cleaning up the debris in order to make the roads passable as quickly as possible, the U. S. Army furnished the Massachusetts Department of Public Works with cranes, as well as men from their labor battalions and some German prisoners. Men were sent from other districts of the state to assist in this work, which resulted in the roads being opened in a short time after the hurricane.

Contracts were advertised as quickly as possible and awarded promptly for the removal of stumps, for a temporary bridge, and the repair of washouts. Practically all of the work was completed by the end of November.

An Aid to Spanish Free to C&E Readers

Many American construction men are showing an increased interest in South America and are looking for means to enable them to learn Spanish easily. Although it is not generally known, more than 300 Spanish and English words are spelled exactly the same. Simple rules for changing the endings of thousands of English words automatically convert them to Spanish words of similar meaning. It is possible then for the average North American, whether of school age or adult years, to acquire a rather extensive smattering of the Spanish language with a minimum of study and effort, through learning which English and Spanish words are identical in spelling, and which English words may be readily converted to Spanish by the easy expedient of changing the endings.

The Pan American Society, Apartado 315, Quito, Ecuador, South America, has prepared a free pamphlet which describes the words and endings referred to above. This pamphlet was prepared by Professor Senor Don Arturo Montesinos M. especially for free distribution in North America by the Pan American Society through its Quito offices. Interested readers of CONTRACTORS AND ENGINEERS MONTHLY should write direct to this Society, addressing their requests to Senor M. A. Alvarez, Secretary. Please be patient in waiting for these free pamphlets to arrive, since the regular ship mails between the America's are somewhat irregular at this time.

Spats for Mechanics

Ankle and foot protection against acids, alkalis, oils, solvents and greases is provided by a new spat, made by the American Optical Co., Southbridge, Mass., for machine shop and garage workers. The spat is made from a coated fabric which gives the same protection as rubber but is much lighter in weight and very flexible. Three snap fasteners at the top and two at the bottom make the spat easy to put on and adjust, and assure quick removal. An elastic strap fits under the instep. A large flare assures overall protection of the instep. The spat is neat, snug-fitting and comfortable, and pants may be worn over the spat or tucked inside.

Further information and prices may be secured by writing direct to the manufacturer and mentioning this magazine.

When the War Ends—

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Highways, rivers, railroads, rights of ways, etc.

Until then we are engaged wholly on work for the Government.

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This is a Telsmith Portable Crushing Plant being operated by the Seabees on Guadalcanal. The two gas-drum halves at the top of the elevator form an ingenious rig devised by Seabee Sanborn (at extreme left) to keep the propeller wash of warming up aircraft from blowing away the crushed material, discharged by the elevator.

TELSMITH
with the Seabees
ON GUADALCANAL

"Every rock is a sock at Tojo"—that was the motto of the crusher crew of the 14th U. S. Navy Construction Battalion—working-fighting Seabee veterans of Guadalcanal and winners of the Presidential Citation. Part of that "outfit" is pictured above in action on Guadalcanal in 1943—making full-speed-ahead with their 10" x 21" Telsmith Portable Crushing Plant, crushing rock to maintain an air field.

Standing at the extreme left is C. A. Sanborn, Machinist's Mate First Class. Like many Seabees, he had previous civilian rock-crushing experience. He held an executive position with the Lehigh Stone Company, which has offices at Kankakee, and quarries at Lehigh, Illinois.

In all parts of the world the Seabees and Telsmith portable, semi-portable, and large scale aggregate production plants are carrying on, helping to bring V-day closer. Telsmith peacetime portables will have large capacity with lowest operating costs—*get Bulletin P-34.* P-10

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Storms Strike Twice At Carolina Bridges

Some of the vicissitudes of bridge maintenance are recounted in an item which appeared recently in the E. F. Craven Co.'s *Road Machinery News*, based on experiences of the North Carolina State Highway and Public Works Commission.

One day in September, 1933, C. B. Taylor, Bridge Maintenance Engineer, and O. F. Yount, Superintendent of Bridge Maintenance for the Highway Commission, rushed to the bank of the Neuse River in New Bern where 165 spans of the bridge there had been washed away by a flood the previous day. Exactly eleven years later to a day, a similar disaster occurred when the recent hurricane, accompanied by unusually high tides, struck along the coast line.

The second victim was the bridge between Nagshead and Manteo, where the 272-foot 14-span bridge, together with the supporting piles, were worked out by the storm and carried off on the strong tide. The situation was further complicated by the fact that a large barge broke loose from the tug which was towing it. This last catastrophe knocked off center the drawbridge across the inland waterway at Coinjock, thus delaying by a week the transportation from the mainland of material and equipment to repair the bridge. Further delay was caused by the damage at the Nagshead approach, where 3,000 feet of roadway was completely washed out and had to be rebuilt before the necessary equipment could be brought to the bridge site.

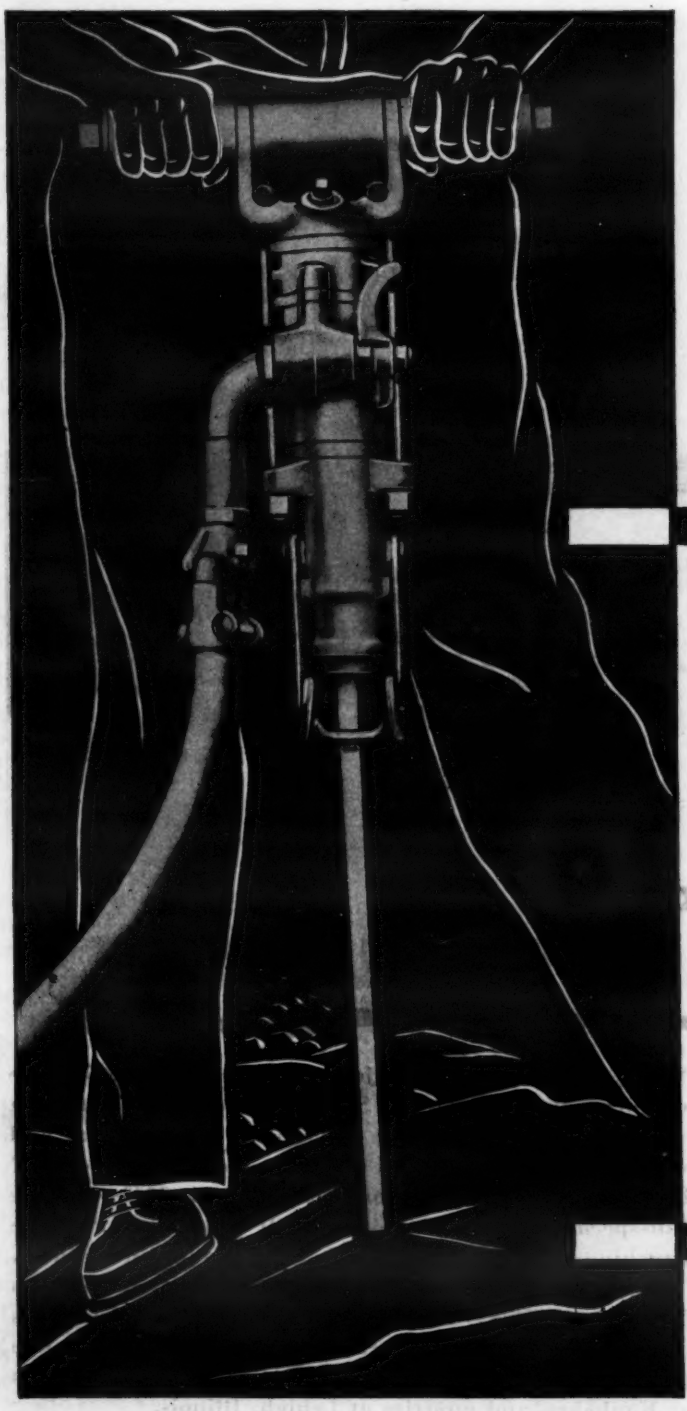
There was one bright spot in the picture. Mr. Yount was fortunate in being able to salvage the timber of all 14 spans from the bridge, which he found scattered over several hundred acres of marshland. The timber was in good condition and can be put back in the bridge with, no doubt, a fervent hope that it will stay there.

In addition, according to C. B. Taylor, there were forty-seven other bridge spans washed out along the eastern Carolina coast in the September, 1944, storm.

Cable-Operated Scoops For Variety of Jobs

A line of cable-operated scoops which have a number of applications in highway construction is described and illustrated in literature available from the Heil Co., 3000 W. Montana Ave., Milwaukee 1, Wis. The Hi-Speed Tractor-Scoop, consisting of a 150-hp rubber-tired diesel-powered tractor and a 15-yard cable-operated scoop, is described as a high-speed dirt-moving unit capable of transporting heaped loads at speeds up to 20 mph, depending on road conditions. The Dig-N-Carry twin-cable scoops are said to perform digging, carrying, spreading and grading operations with equal efficiency, and are available in six models, from 6 to 25 yards rated capacity. Complete specifications and details of construction and operation are given in the catalogs.

For copies of the catalogs describing these scoops write direct to the manufacturer and mention CONTRACTORS AND ENGINEERS MONTHLY.



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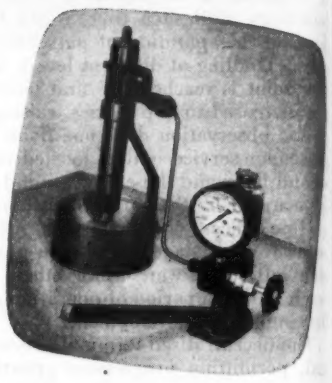

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6th WAR LOAN

Avoid Legal Pitfalls

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Edited by A. L. H. STREET, Attorney-at-Law.

Modified Contract Does Not Benefit Subcontractor

If the parties to a subcontract mutually intend that any benefit which may come to the general contractor through subsequent modification of the contract with the owner is to be passed on to or shared by the subcontractor, that intention should be expressed in the contract. The mere fact that the general contractor may be able to secure a favorable change in the terms of his contract with the owner does not automatically make the subcontractor a beneficiary of the change.

A Massachusetts highway repair contract called for replacement of guard rails and stacking of the old wooden rails at places designated by the supervising engineer. A subcontractor agreed to erect the new concrete rails and incidentally undertook the work of stacking the old rails. Later the Commonwealth amended its contract with the general contractor by allowing $1,148 for the work of stacking. In a suit by the subcontractor against the general contractor, the former claimed that the extra allowance should be turned over to him since he did the work.

The Massachusetts Supreme Judicial Court decided that the extra remuneration belonged to the general contractor; that the subcontractor was entitled to only as much money from the general contractor as was called for by the contract between them, without regard to what sort of arrangement the general contractor might make with the Commonwealth. (Russo v. Charles I. Hosmer, Inc., 44 N. E. 2d, 641.)

Contractor's Bond Covers The Rental of Equipment

One of the many points on which the courts disagree pertains to the right of a lessor of construction equipment to hold a contractor's surety liable under a bond conditioned for payment of labor and materials furnished to the contractor. In many instances, the lack of judicial agreement is due to a difference in the wording of statutes, but in other cases the cleavage results from judges not seeing eye to eye on the question whether statutes requiring such bonds should be liberally or strictly interpreted.

The Supreme Court of Nebraska is one of the tribunals that gives a liberal reading of such statutes. So, it happens that in the case of Peter Kiewit Sons' Co. v. National Casualty Co., 8 N. W. 2d, 192, it was decided that a highway contractor's bond to pay for labor and for "materials, lubricants, * * * *used* or consumed in the construction of the work", covered the rental charge of equipment leased to the contractor, the cost of transporting the same, and a fee for supervisory services. The court said: "The rule adhered to in some jurisdictions, that the materials to be lienable must be incorporated into the structure or public work for which the contract was executed, under the circumstances here existent is too narrow."

The court cites in support of its conclusions a decision of the Tennessee Supreme Court where a similar bond was held to cover the rental charge of a steam boiler used in constructing a bridge, and a decision of the Oregon Supreme Court, ruling that a bond covered the rental value of a tractor used in constructing a highway.

Unwarranted Interference With Public Contractors

That the judicial arm of a state may sometimes be more fair-minded than the executive arm is indicated in a case lately decided by the New York Court of Claims. It was decided that a state bridge contractor was entitled to reimbursement against losses entailed by unwarranted interference by the State's engineer with the performance of the job. (Frank A. O'Hare Co. v. State, 42 N. Y. Supp. 2d, 92.)

Indefinite Contracts

A commercial contract may be likened to a pair of handcuffs when two men are manacled together. Each is mutually bound to the other. But if the handcuffs are fastened to the wrist or wrists of one man only, the resemblance fails because no contract is binding if it purports to hold one of the parties and leave it optional with the other to be bound or not as he pleases. (An exception exists, of course, where one *pays a consideration* for an option to buy something or to secure some other advantage.)

But even judges sometimes fail to agree upon just when a supposed contract is so one-sided as to be unenforceable. Take, for example, the case of Dockson Gas Co. v. S. & W. Construction Co., 12 So. 2d, 847, decided by the Louisiana Court of Appeal, Second Circuit. There the gas company agreed to furnish contractors butane gas to heat certain buildings "for the 1940 and 1941 winter season". The contractors attempted to justify their refusal to accept delivery of the gas on the ground that the contract was too uncertain in its terms to be mutually binding. A trial court upheld that contention, but the Court of Appeal reversed the decision, ruling that the gas company was entitled to damages based upon loss of profits on the minimum volume of gas that the contractors probably would have consumed during the remainder of a three-month period generally regarded locally as constituting winter.

The decision of the Court of Appeal is in line with many judicial precedents that have been handed down throughout the country, to the effect that a contract to sell such supplies as the buyer will require in carrying on a certain business or operation is sufficiently definite and is enforceable. The reasoning of the courts is indicated by what the Court of Appeal said in its decision on the Louisiana case:

"Fuel for heating was a necessity for the defendants and their agreement to the proposal was *not an agreement to take such amount of a commodity as their whim or caprice might indicate*, but to take such amount as would be *required* for the purpose of heating their buildings."

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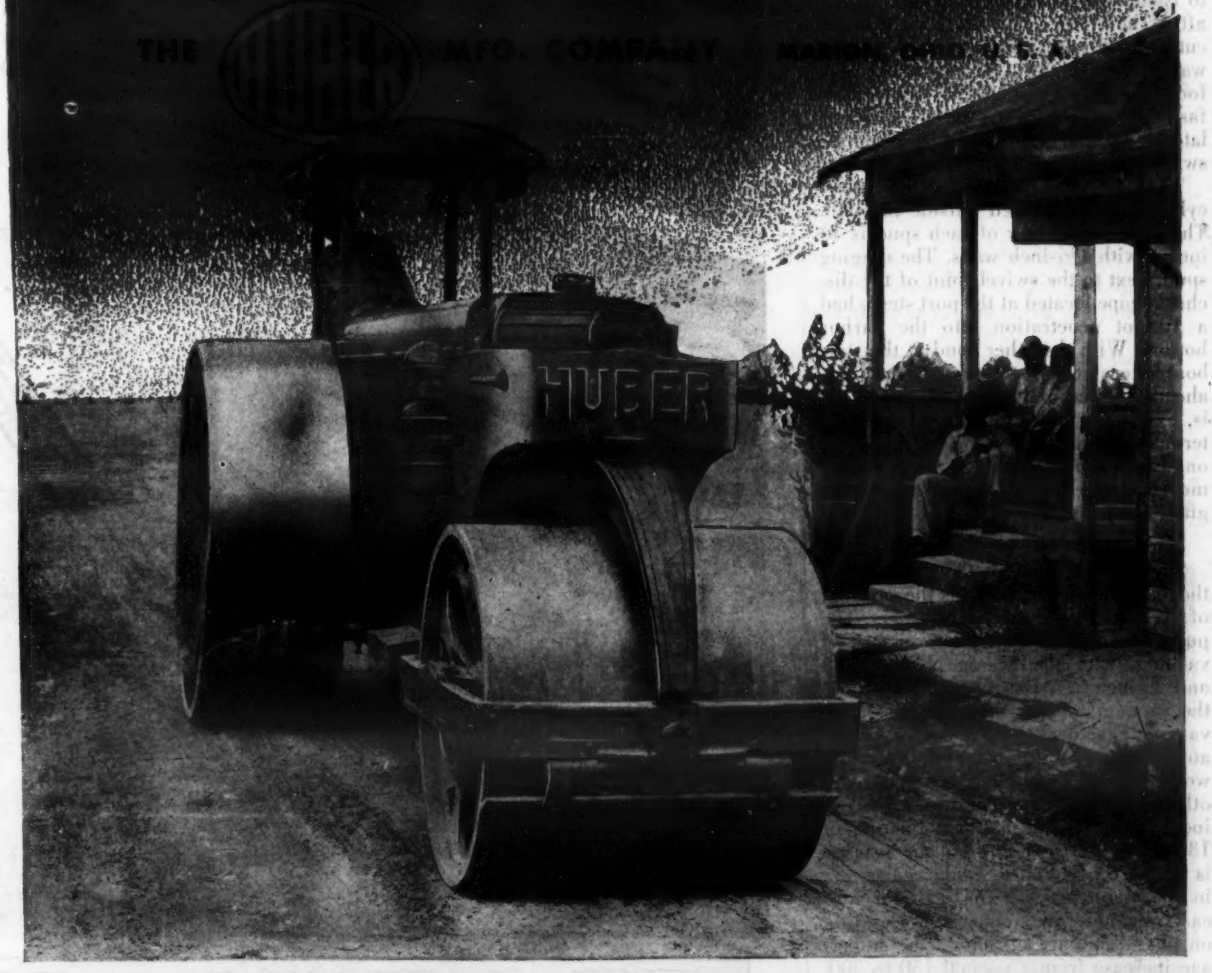

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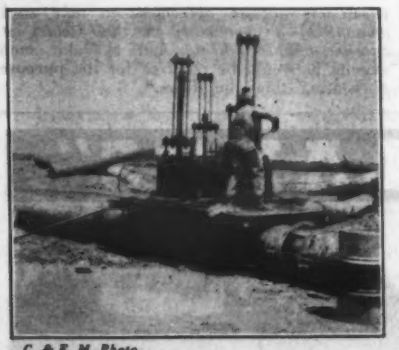

C. & E. M. Photo

New manually operated hydraulic valves, developed recently by Gahagan, speed up shifting the discharge from one spur line to another.

Dredge No. 5 Works At East Boston Airport

(*Continued from page 2*)

material not likely to fail, for any repairs through this section would be costly. An automatic depth gage, a pulley and weight combination, is rigged on the port side of the ladder to show the dredge operator the depth at which the cutter is working.

Movements of the Dredge

Working almost continually in clay, the No. 5 required speedy lateral mobility to effect a uniform cut 40 feet below mean low water. The contractor was not required to remove any ledge encountered above that depth or any other material too hard to be removed by hydraulic dredging. The dredge can swing 137½ feet to port and starboard from a ranged center line by means of its swing engine, running cables and anchors. Massachusetts Department of Public Works survey parties established clearly marked center lines for the dredge to follow. A 5-ton anchor was placed 150 feet to each side of the dredge, and slightly aft of the bow, to prevent damage to the cutter head when the limit of the swing was made. By means of a running 500-foot length of 1¼-inch plow-steel cable fastened to the anchors, the dredge has a lateral movement of 275 feet when its swing engine is operating.

The No. 5 has two 75-foot-long steel cylinder spuds located outside the hull. The outside diameter of each spud is 40 inches with 1¼-inch walls. The digging spud, next to the swivel joint of the discharge pipe located at the port stern, had a 10-foot penetration into the harbor bottom. With the other spud at the starboard stern corner, the dredge can move ahead longitudinally by "walking"; that is, by raising and lowering the spuds alternately from the bottom and swinging on the anchored cables, the dredge moves through the water as though on giant stilts pivoting on the bottom.

Operating No. 5

High up forward in the deck house, the dredge operator controls the working of the dredge and watches his gages. The pump can develop up to 25 inches of vacuum, with the average between 18 and 20 inches. A Bristol recorder charts the vacuum for the full day. When the vacuum gage drops to 3 inches, the operator knows the pump has not enough work to do, so the dredge is moved to another location. The pressure in the 30-inch discharge line has a maximum of 130 pounds at the pump but the average is about 100 pounds. Similar gages are in the engine room. The operator also carefully notes the amperage variation on his swing engine. Should the amperage increase from a normal 150 to 300, the cable would be in danger of snapping. Consequently any marked rise in amperage indicates the swing engine is carrying too great a load in moving the dredge and calls for an investigation. On the cutter motor the average amperage is 1,200.

The discharge line carries a combination of water, clay, and some gravel. The velocities of these three materials vary, the water having the greatest velocity, naturally, at 16 feet per second; clay is next with 12; while gravel has a velocity of 10 feet per second. Stoppages in the line may be caused by too much solid material being passed and backing up. This is especially the case with a heavy gravel flow. On the Boston airport job, the No. 5 averaged 15 per cent solid material through its discharge line.

An adequate machine shop is located on the main deck, port side amidships. Here, compactly fitted in, may be found a LeBlond 21 heavy-duty lathe, a Rockford drill press, a Gould & Eberhardt shaper, a Greenfield threading machine, and a buffer and grinder. Further along towards the stern are two Lincoln portable gas-driven 400-ampere arc welders.

Auxiliary Floating Equipment

Fuel oil for the boilers on the No. 5 came from a Socony-Vacuum station on the Mystic River, a short distance from the main ship channel. A tug towed a steel oil scow there and back for loading. This oil scow is 129½ feet long, 31 feet 9 inches wide, and 8½ feet deep, with a capacity of 212,000 gallons.

The water supply was close by, with a 4-inch main leading right to the edge of a dock adjacent to the airport. A steel scow 60 feet long x 30 feet wide x 5 feet deep carried 58,000 gallons of water.

Another piece of floating equipment servicing the dredge was a ⅜-inch steel-plate derrick barge, 68 feet long x 34 feet wide x 6 feet deep. The derrick has a 15-ton lift on a 45-foot radius and is powered by a 50-hp gas engine. It is used for changing the main pump, the lower half of which weighs 12 tons and the upper half 8 tons. The completely assembled pump weighs 32 tons.

The contractor used four diesel tugs

(*Concluded on next page*)

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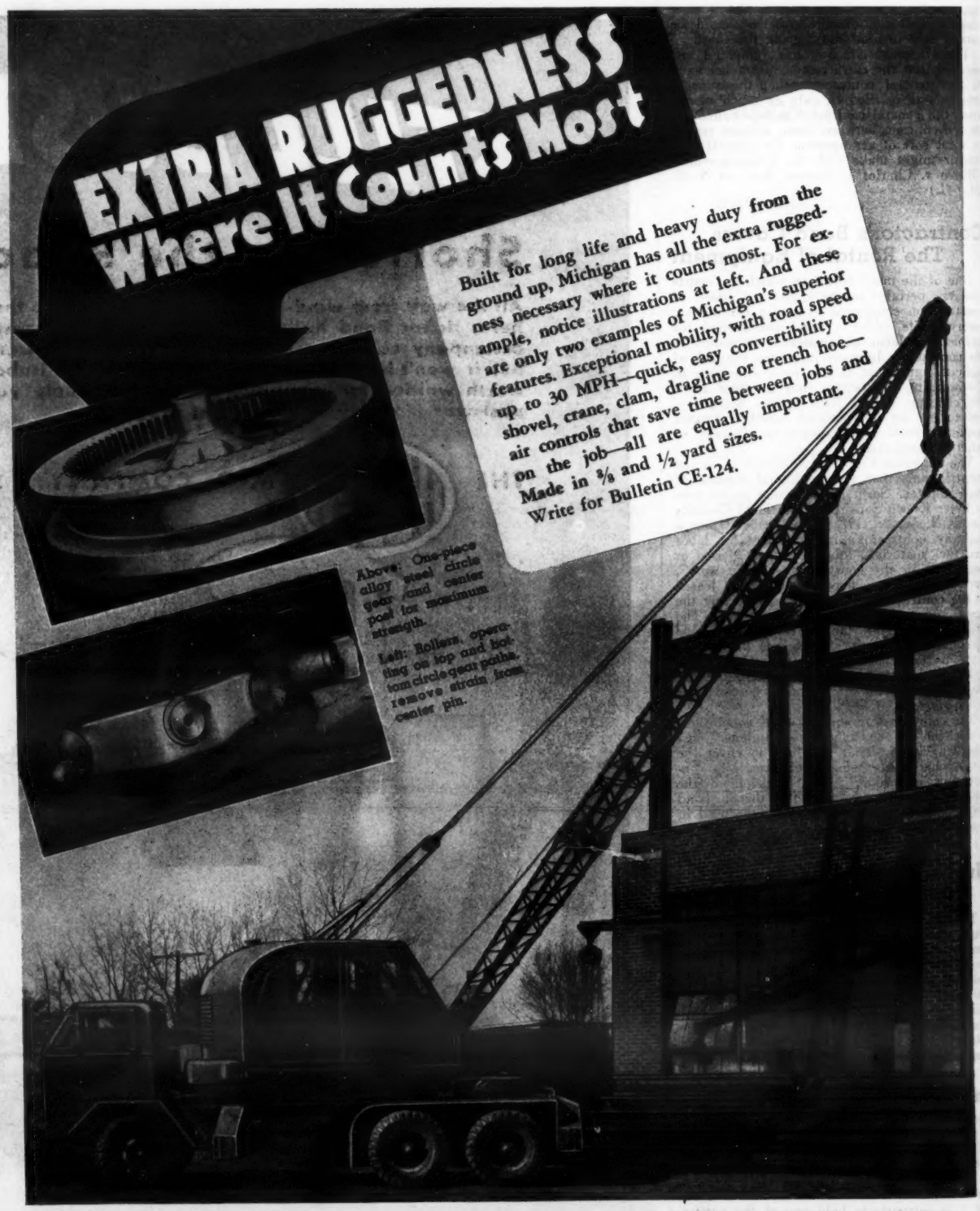
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Above: One-piece alloy steel circle gear and center post for maximum strength.
Left: Rollers, operating on top and bottom circle gear paths, remove strain from center pin.

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Mass. Department of Public Works Photo

The discharge of clay hydraulic fill from the 30-inch line of No. 5 dredge on the center line of the north-south 7,000-foot runway foundation at the East Boston Airport.

Hydraulic Fill Used For Two New Runways

(Continued from preceding page)

in moving his men, barges, and equipment about the job. They were the 225-hp Eleanor O'Riordan, 52½ feet long, 17 feet beam, and 6½ feet draft; the 160-hp Corthell, 42 feet long, 13 feet beam, and 7 feet draft; the 120-hp Haymer, 49 feet long, 15 feet beam, and 8 feet draft; and the 60-hp William J., 42 feet long, 13 feet beam, and 6 feet draft. The first three have Atlas Imperial diesel engines while the William J. is powered by a Fairbanks-Morse diesel engine.

Discharge Line

The No. 5 sucked steadily in the blue clay, delivering it to the 30-inch discharge pipe which leaves the dredge at the port side of the stern and was carried on pontoons for 2,200 feet to the shore. These pontoons varied in length according to the number of 38-foot pipe sections to be carried, from one to three. A pontoon usually consisted of four cylinders held in position by 10 x 10-inch timbers, and surmounted by a safety walk, made from two 2 x 10-inch planks and equipped with a hand railing fashioned from 2 x 4's. A telephone communication line ran along the catwalk. Joints in the pipe over water were of the ball-and-socket type supported by a gland held in place by six bolts.

The land line, also 30 inches in diameter, was of ⅜-inch rolled steel pipe in 16-foot lengths running for 3,800 feet. The total length from dredge to outflow was 6,000 feet. The land sections of pipe were connected by 6-inch male and female slip joints. Joint leaks were stopped by wedging wooden shingles 10 inches long x 2 inches wide x ¼ inch thick into the loose joints.

Hydraulic Valves on Spur Lines

Elevations of the fill embankments varied in different sections of the work from a low of 16.5 feet to a high of 24.0 feet at the center line. A tolerance of one foot above or below the placement line was permitted. A core, or central portion of the fill 200 feet in width, was placed in advance of the shoulders. This was accomplished by having three spur pipe lines of 30-inch pipe coming off the main land line from the dredge. These three lines were spaced about 80 feet apart, with the center pipe line about 50 to 75 feet in advance of the two flanking lines. By keeping the center or core high, natural drainage on the slopes was provided, thus preventing hollows in the fill which cause planes of weakness. The embankments slope out from the center line 250 feet on each side to an elevation of 14 feet at the shoulders. The practice was to keep the core slightly above grade, for in final grade adjustments cutting is preferable to filling. No bulkheads or barriers to control the flow were required in the pumping of the beach; the fines ran off in a natural gravity flow. Any pools that formed were promptly ditched for drainage by digging a run-off channel with mattocks or shovels.

Formerly, hand-operated valves on the spur lines, requiring fifteen minutes work by six men, were used for shutting off and turning on the flow of pumped material. The contractor, within the last year and a half, has developed a new hydraulic valve, manually operated, that enables one man to do this operation in one minute. The valve consists of an oil reservoir on top, hooked up with a double-acting piston working on a shaft that extends through the cylinder casing. In these days of labor shortages, the new valve is a boon in replacing the old, slower, costlier method of flow control.

Setting pipe on the beach was a hand operation, but the land crew was aided by a Caterpillar RD8 tractor with bulldozer that either pushed or snaked the pipe into position for locking into the line, or dismantled the line for moving to a new location on the beach. Two gasoline cranes, a Koehring 301 and a P&H, were used for lifting pipe. Seven wooden mats, of assorted timbers bolted and nailed together, 30 feet long, 4 feet wide and 6 inches thick, were placed on the fill to give the cranes a bearing surface on which to operate.

A total force of 220 men was employed, divided equally between the two dredges. Working three shifts a day, the dredge crews for the night and afternoon tricks numbered about thirty, while the day crew consisted of fifty. Half of this number worked on the dredge or floating equipment, while the rest were on shore maintaining or moving the discharge lines and valves as required.

Power Supply for the Nebraska

Power for the all-electric Nebraska came from the Boston Edison Co. plant in South Boston. An underground duct for the cable was laid from the power plant to a transformer barge tied up at Castle Island over a mile away. Here the current was reduced from 14,000 to 7,000 volts and carried by 6,500 feet of 4-inch armored 3-strand copper submarine cable to a cable-reel barge moored near the dredge on the opposite side of the main ship channel.

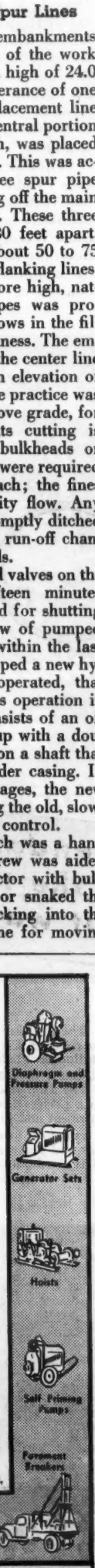
Personnel

Construction at the East Boston airport, the official name of which is the General Edward Lawrence Logan Airport, East Boston, is directed by Massachusetts Commissioner of Public Works Herman A. MacDonald and his two Associate Commissioners, George W. Schryver and Robert L. Whipple. Director of Waterways is General Richard K. Hale with Everett N. Hutchins as District Waterways Engineer. Walter H. Gahagan is President of the Gahagan Construction Corp. of New York City, with Louis J. Newburg, Vice President, and O. J. Hussin, General Superintendent.

The very least you can do to back up the men at the front is the most you can do. Buy more Bonds!

Post-War Construction will be BIG . . . too big to be done by hand! The successful peacetime Contractor will be the man with the most modern Construction Machinery. Labor-saving equipment is money-making equipment.

A Novo Hoist will raise your prestige in the Construction Field . . . will raise your chances of getting the big jobs . . . will raise your profits from close bids. Novo Hoists are built to handle the job . . . and built to be easily handled. They are job-designed, field-proven, and have plenty of power. Novo's complete Line of Hoists ranges from 1,000 to 8,000 lb. capacity. We Raise this POINT . . . YOU can be helped by a Novo Hoist.



To get complete information about Novo Hoists, simply "raise" your pen and "drop" us a line.

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ROTOBLADE SNOW PLOW

Rotoblade— The combination blade and rotary snow plow that accumulates and eliminates the snow in one operation. . . . It's NEW. . . . It's fast and reduces snow removal costs.

Airports— Rotoblade is the fastest plow on wheels. Does NOT create windrows or drift hazards. Costs less to buy and less to operate and maintain. Does the job in one third the time.

Highways— Rotoblade does the job better at about the same cost as a blade plow.

Snow Removal Equipment Co.

400 Seventh St. **San Francisco, Calif.**

THERE IS A DEALER NEAR YOU. WIRE US.

One of the line of Kiekhaefer Mercury industrial air-cooled engines.

Air-Cooled Engines For Pumps and Tools

Air-cooled gasoline engines, designed with one and two cylinders and operating on a two-stroke cycle, in four models from 2.5 to 9 hp at 2,000 to 4,400 rpm are being manufactured by Kiekhaefer Corp., Cedarburg, Wis. These unit-built Mercury engines are used to power pumps, portable tools, grinders, paint sprayers, air compressors, electric generator sets, blowers, power winches, and other portable construction equipment. Kiekhaefer-built engines have anti-friction bearings throughout, aircraft-type magnetos, die-cast airflow cylinders, a magnetic mechanical starter, close speed regulation, and are remarkably free from vibration. They range in weight from 46 to 62 pounds, have an overall length from 13 to 15⅞ inches, an overall width from 16¼ to 17 inches, and overall height 16⅛ to 17 inches.

Complete information on these engines, which have been used extensively in military operations, notably for powering chain saws on the war front and in lumber camps, may be secured from the manufacturer by writing direct and mentioning this news item.

1945 Truck Models For Civilian Uses

The commercial trucks to be produced in 1945 by International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill., will carry the same model designations and be styled the same as Internationals built for civilians in 1942 and 1944. The company announces that, in keeping with its policy of constant product improvement through the incorporation of new design features and new materials as soon as they have been proved by exhaustive tests, these new trucks will embody many new features and improvements, most of which have been incorporated in the various military models it has produced since March, 1942.

It is now permissible, under material regulations, to make use of these improvements in civilian production. The new civilian trucks will be sold through the regular International-Harvester dealer and branch organization to operators whose business requirements place them on the ODT priority list. Five basic models will be available in a variety of wheelbase lengths and with equipment to meet the requirements of essential users.

Production of the popular medium-duty Model K-5, powered by Harvester's Green Diamond engine, will be continued, as will the heavy-duty Models K-7 and KR-11, which are powered by Blue Diamond and Red Diamond engines, respectively. Additions to the line for 1945 will be the light-duty K-3 and the heavy-duty K-8, also basic pre-war models. These trucks have the following gross vehicle weight ratings: K-3, 6,650 pounds; K-5, 13,500 pounds; K-7, 16,500 pounds; K-8, 20,000 pounds; and KR-11, 27,000 pounds.

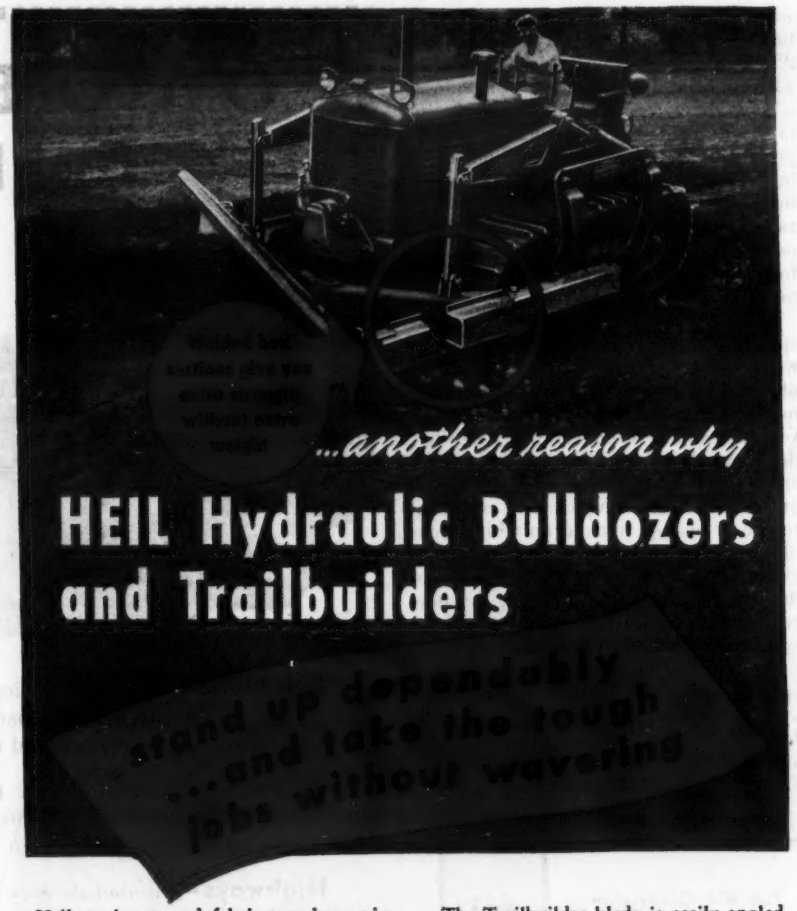
An improved type of crankcase ventilation will be supplied in the International Red Diamond engines. The value of this ventilation system lies in its ability to reduce the accumulation of crankcase vapors, resulting in a highly desirable reduction of sludge so detrimental to engine efficiency. The system includes a metering valve, installed in the oil filler pipe, and a cylinder-head breather. The metering valve, which is connected by a vacuum line to the intake manifold, controls the amount of vapor-laden fumes drawn from the crankcase by the intake manifold vacuum. The cylinder-head breather filters the air being drawn into the engine through the valve rocker-arm compartment. Operation of the crankcase ventilation system consists, therefore, in drawing cleaned air into the engine and, as previously stated, withdrawing the fumes from the crankcase. This ventilating system has been used with excellent results in Red Diamond engines which power certain military trucks and half-track vehicles produced by International Harvester.

Further information regarding the equipment of the five 1945 International models may be secured direct from the manufacturer.

Center-Line Drains Save County Roads

Each spring Wayne County, in the western part of New York State, has experienced break-ups in its highways where wet spots have developed in the subgrade. Since deep side ditches to drain off this water were not possible, the County decided to use vitrified Skip-Pipe. L. R. Barnes, County Superintendent of Highways, installed a shallow center-line drain just 30 inches below grade, using 6-inch clay Skip-Pipe with a 25 per cent thicker wall. This made possible the shallow trench, as this pipe will withstand drive-over road pressures in excess of 10,000 pounds, according to the manufacturer.

Skip-Pipe, made by The Robinson Clay Product Co., Akron 9, Ohio, is also used extensively for driveway culverts, primarily because of its strength and because it will not rust. Complete information may be secured by writing direct to the manufacturer and mentioning this news item.


...another reason why
HEIL Hydraulic Bulldozers and Trailbuilders
stand up dependably ...and take the tough jobs without wavering

Heil engineers and fabricators have pioneered the modern practice of replacing heavy members with welded box sections that are lighter, stronger, and easy to repair in the field without costly delays. The advanced design of Heil equipment assures you of more speed . . . greater flexibility . . . and ability to push through when the going is tough. Because they're tailormade to Cletrac Tractors, you get full visibility for safe, efficient handling.

The Trailbuilder blade is easily angled to right or left for side-casting new cuts. Bulldozer blade takes rocks and stumps without changing pace.

The Heil hydraulic system comes close to a perfect leak-proof unit—stays in adjustment and gives a minimum of trouble.

For full loads and more yardage per day and per year — at lower cost — use Heil Earth-moving equipment.

Write for bulletins.

R-24

These people buy a battleship —every week!

Meet John S. . . . . and Mary D. . . . . .

John works at an electronics plant on Long Island, and makes $85 a week. Almost 16% of it goes into War Bonds.

Mary has been driving rivets into bombers at an airplane plant on the West Coast. She makes $55 a week, and puts 14% of it into War Bonds.

John and Mary are typical of more than 27 million Americans on the Payroll Savings Plan who, every single month, put half a BILLION dollars into War Bonds. That's enough to buy one of those hundred-million-dollar battleships every week, with enough money for an aircraft carrier and three or four cruisers left over.

In addition, John and Mary and the other people on the Payroll Plan have been among the biggest buyers of *extra* Bonds in every War Loan Drive.

They've financed a good share of our war effort all by themselves, and they've tucked away billions of dollars in savings that are going to come in mighty handy for both them and their country later on.

When this war is won, and we start giving credit where credit is due, don't forget John and Mary. After the fighting men, they deserve a place at the top. They've earned it.

You've backed the attack— now speed the Victory!

CONTRACTORS AND ENGINEERS MONTHLY

Cooperation Helps To Better Tree Care

(*Continued from page 37*)

limbs with a clean cut, and all limb scars more than 1 inch in diameter must be painted with an approved tree paint. In the case of failure or refusal to perform work in accordance with instructions from the State Highway Commission or its authorized representative, the Commission may use the sum deposited by the petitioner, or such part of it as may be necessary, to complete pruning operations in a proper manner, to clean up all litter or trimmed branches, or the Commission may retain this sum in satisfaction of damages caused by mutilation or improper trimming.

Special Problems

Special foliage-clearance problems arise from time to time. Sometimes a tree or two is sacrificed and the utility company allowed to plant several small trees in payment for each item removed. These trees are placed 15 feet or more from the utility line and occasionally are planted on a different route section if the right-of-way from which the trees are removed is not adequate for the future growth and development of trees.

In a number of instances where tree-pruning men get out of line and mutilate the trees or cut trees that were to be saved, an adjustment has been requested. The utility company involved usually has made an adjustment rather than have the State Highway Commission cash the deposit check which accompanied the application to prune trees.

In 1934, the State Highway Commission of Kansas issued a pamphlet "Tree Pruning Suggestions for Utility Companies". This blueprinted pamphlet of seven 8½ x 11-inch pages shows both good and improper methods for pruning of limbs, for line clearance, and for dwarfing trees under utility lines. The supply of this pamphlet available for distribution is very limited but, as long as the supply lasts, landscape architects and landscape engineers of state and county highway departments may secure a copy by writing direct to the author at Topeka, Kansas.

Safety Hoist Hook Designed by Engineer

A new heavy-duty hoist hook, designed by an engineer to meet his own requirements for safety on the job, has just been put on the market. Equipped with a patented self-locking shoulder and lip arrangement to eliminate load slippage and hook straightening, this ACLC safety hoist hook is carefully engineered to keep hoist and load in true alignment. Even should the heavy pin shear, it is stated that the weight of the load would continue to hold on the safety shoulders and lips, which are designed to clear hatches, cornices and other protuberances without snagging. The guaranteed capacity of the No. 2 hook is 10 tons, and it has withstood without ill effects a Columbia University Laboratory proof load test of 60,000 pounds. Other sizes will be made to handle capacities up to 200 tons.

The invention of Robert Hoffman, whose assignments have included such projects as the North Island Naval Base at San Diego and the Pan American Highway, the ACLC hoist hook is the result of numerous experiments to achieve the maximum in safety. The No. 2 hook weighs only 9½ pounds and is moderately priced.

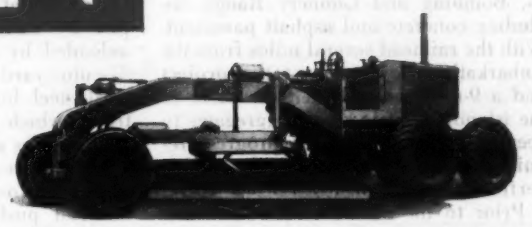
For more complete information about this hoist hook, write direct to the manufacturer and distributor, the American Chain Ladder Co. Inc., 151 East 50th St., New York, N. Y., mentioning this item.

Dresser Industries Moves

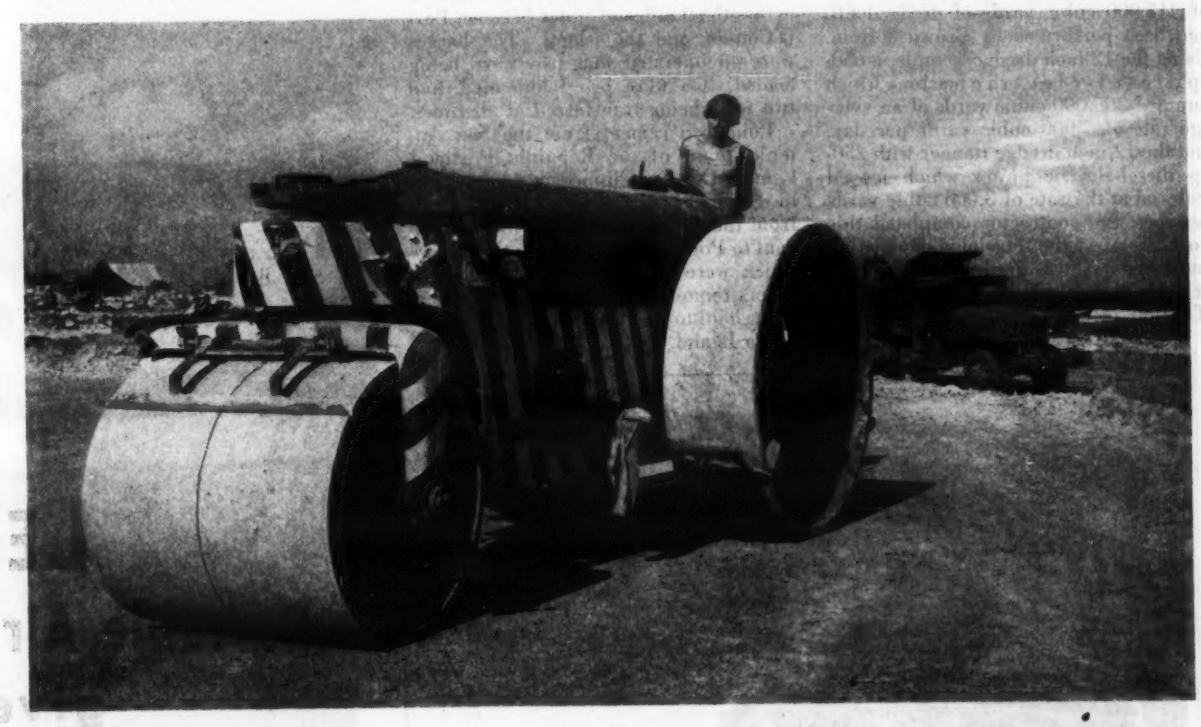
The headquarters of Dresser Industries, Inc., manufacturer of equipment for the oil, gas and industrial fields, will be moved shortly from Bradford, Pa., to Cleveland, Ohio. The executive offices will be located there in the Terminal Tower.

GALION FOR "TOPS IN PERFORMANCE"

Both men and machines are giving of their best in this war . . both men and machines command our respect for their efforts to bring peace to the world. Time and time again you will find that Galion rollers and motor graders played a vital part in the advance on many of the fighting fronts . . building strategic roads and airports. Galion road machinery will prove equally as important tools in any postwar construction program.



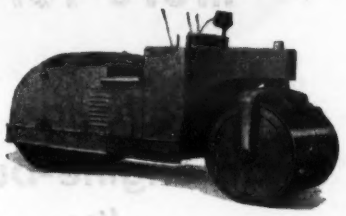
Galion No. 101 motor grader for that heavy grading job.



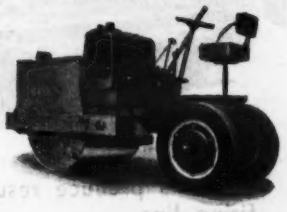
U. S. Navy Photo

• • •

Galion Tandem roller (below). A Galion 3-wheel Chief roller is shown above.



A Galion portable roller is shown below. Also sheepsfoot rollers.



A COMPLETE LINE

of road rollers—gasoline or diesel power—for precise compaction in road and airport construction. Be sure you say GALION on that next job.

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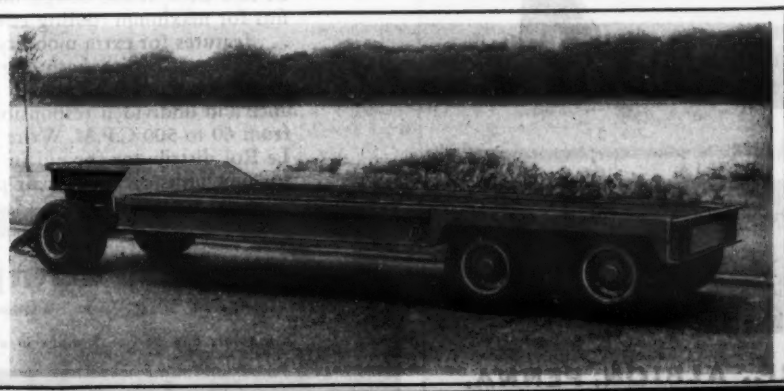

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Material Delivery For Concrete Apron

Over-Water Transportation Of Supplies for Offshore Army Job Well Handled By Texas Contractor

✦ A CONTRACT was awarded during 1944 by the Galveston Office of the U. S. Engineers to Brown & Root, Houston, Texas, for the construction of additional facilities at the Matagorda Island, Texas, Bombing and Gunnery Range, including concrete and asphalt pavement. With the railhead several miles from the embarkation point nearest the project and a 9-mile water haul from there to the island, the delivery of aggregates to keep pace with scheduled progress required careful planning and efficient performance.

Prior to the award of this contract, a preparatory contract amounting to $102,920, and including the construction of 415,000 cubic yards of dredged fill, had been performed by Brown & Root. Using the 12-inch dredge Temple, a 650-hp diesel-electric machine which pumped 365,000 cubic yards at an average rate of 7,000 cubic yards per day, and the 12-inch dredge Ranger with 250-hp diesel-electric power which moved material at the rate of 3,000 cubic yards per day, the contractor completed this work ahead of the scheduled completion date. Material was dredged from depths of 4 to 18 feet and moved a maximum of 3,000 feet, with the average 2,000.

The contract for paving three new runways, 4,000 x 150 feet, of plant-mix asphalt on a flexible base was started in close coordination with the dredging contract and included a concrete tie-down apron 1,850 feet long x 250 feet wide. The latter is the subject of this article.

Difficult Aggregate Delivery

Aggregates for the concrete pavement were produced by the Fordyce Sand & Gravel Co. at Victoria, Texas, and shipped by rail to Seadrift. They were unloaded by a Koehring crane with a ¾-cubic-yard clamshell through a 30-yard steel bin to Ford and Chevrolet trucks which hauled 4-cubic-yard loads to stockpiles at Port O'Connor, 19 miles away. There a Caterpillar D7 tractor with a LeTourneau bulldozer kept the material pushed up to the Northwest crane used to load the barges, having a 400-ton average capacity, for transfer across the 9 miles of water between Port O'Connor and the island. The barges were so operated that two were being loaded, two were being unloaded, and two were being transferred at all times.

Longhorn cement from the San Antonio plant of the Republic Portland Cement Co. was shipped in paper sacks to Seadrift and transferred by hand from the cars to trucks for the 19-mile haul to Port O'Connor. From the trucks, which were driven onto the barge, laborers removed the cement for the over-water haul to the batching plant at Matagorda Island.

Batching and Hauling

At the batching plant the barge was used for cement storage. When paving was in progress, the sacked cement was transferred by hand to a flat steel platform, which was swung to the loading dock by a small crane. There two men unloaded the 6 sacks of cement per batch and added 100 pounds of locally dredged sand, of which 50 to 80 per cent passed a No. 200 sieve, weighed it on wheelbarrow scales, and wheeled it up a ramp to a platform at truck-body level, from which the batch trucks were loaded.

Sand and gravel were handled by a Link-Belt Speeder crane with a 1½-cubic-yard clamshell directly from the barges to a Blaw-Knox 2-compartment 70-ton steel bin while paving operations were in progress, with the excess going into stockpiles which were augmented during the hours when paving was not under way and used for batching when material was not available on barges.

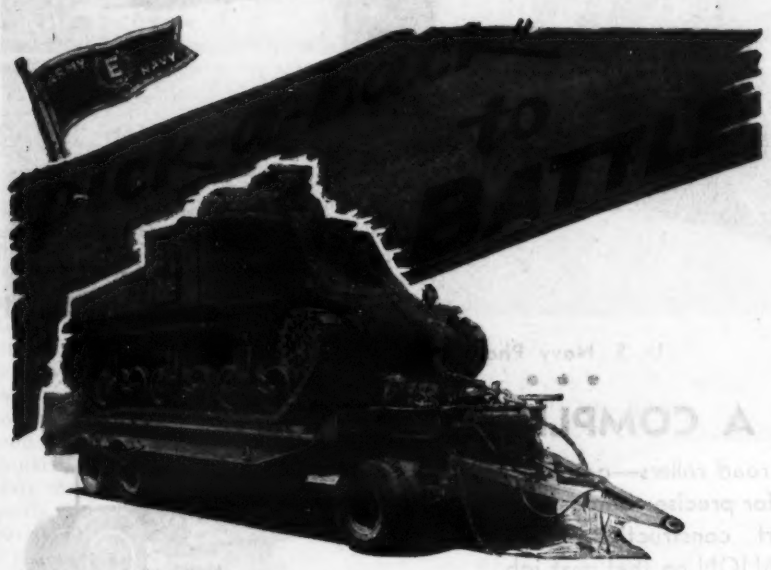
Weighed through batchers with beam-type scales, the aggregates were proportioned to produce a 40.5-cubic-foot batch having a cement content of 4 sacks per cubic yard and a water content of 7.5 gallons per sack of cement. In the interest of tire conservation, only single batches were hauled in the fleet of fifteen Ford and Chevrolet trucks which, on the ¾-mile average haul, proved to be sufficient in number and economical in operation.

Forms and Fine Grade

Approximately 8,000 feet of 9-inch Blaw-Knox steel forms with an 8-inch base were used on the project, being set in alternate lanes for the 1,850-foot length of the apron. A crew of six to eight men handled the form setting while two men pulling and four men working on a flat-bed truck transferred the forms the morning after use, for resetting. A Surgrader prepared the fine grade after the forms were set.

The ¾-inch redwood expansion joints were set ahead at 120-foot intervals by two men who also oiled the forms.

(*Concluded on page* 79)



Tanks produce results only in actual combat on the firing line.

To conserve their fighting capacity they ride to battle on Rogers Trailers, or if damaged are transported to the rear for repairs on a retriever type of trailer especially equipped to load disabled tanks.

Meanwhile, thousands of standard Rogers Trailers are serving efficiently on our factory fronts or in transporting defense equipment to various fortifications.

ROGERS TRAILERS

ROGERS BROTHERS CORP., ALBION, PENNA.

Portable Air Compressors give you more for your money

. . . built to the precision standards of an engine-builder . . . with extra quality where it counts

The same exacting care and precision fit is built into the compressor unit as into the engine itself. You get accurately balanced crankshafts with integral counterweights . . . the weight of pistons and rods is held to extremely close limits.

The heavy-duty engine provides such quick-maintenance aids as overhead valve construction . . . hardened valve seat inserts . . . and removable wet sleeve cylinders. Famous Le Roi Compressor design includes circumferential cooling fins for maximum cooling effect . . . forced-feed lubrication . . . features for extra mobility. Le Roi Compressors are the *only* ones in which *both* engine and compressor are made by the same manufacturer to give you "matched" performance and undivided responsibility. Complete range of sizes from 60 to 500 C.F.M. Write for bulletins. See your nearby Le Roi distributor for aid in filling out government forms for new units or vital repair parts.

C-56

Le Roi Company

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Distributors and Service Stations in all Principal Cities

LE ROI

The new Thew Lorain self-propelled 20-ton crane.

New 20-Ton Crane Is Self-Propelled

A new crane in which the turntable engine is used to power the carrier as well as the turntable has just been announced by the Thew Shovel Co., Lorain, Ohio. This self-propelled unit, operated by one man, is mounted on six wheels, each equipped with dual 11 x 20 rubber tires, and was developed to meet military requirements. However, according to the manufacturer, it can serve construction and material-handling uses wherever unlimited unrestricted mobility and general crane versatility are needed.

Power to propel the unit is drawn from the engine on the crane's revolving turntable and is transferred to the carrier through an auxiliary travel shaft and center pin which are roller or ball-bearing mounted throughout. Gasoline or diesel engines are available. By means of a two-speed transmission on the turntable and a transfer case in the chassis, four travel speeds, ranging from 1 to 7 miles an hour, are provided, with all speeds available on forward or reverse. A maximum grade of 20 per cent can be climbed by the unit in low gear, it is stated.

The final drive is by means of two rear worm-driven Timken axles arranged in tandem, and connected by a through drive which divides engine power equally between the two driven axles. Full-floating axle shafts and a parallel torque rod system are incorporated in the design. The two rear axles are mounted on rocker arms which replace the conventional springs. The front axle has a special wide track for dual wheels and is mounted on heavy-duty springs. The dual front wheels are of the differential style to provide easy steering. Bendix Westinghouse air brakes are standard equipment on all four rear wheels, with control of the brakes located at the operator's position in the cab. Steering of the unit is effected by positive application of air controlled by a single hand lever in the cab.

The chassis frame of the carrier is of the same type as that used on the Lorain Moto-Crane. The revolving turntable mounted on the carrier resembles in general design the Moto-Crane's turntable, except that a third or auxiliary travel shaft has been added, by means of which the unit may hoist, swing and travel simultaneously.

The boom is of all-welded construction, in pin-connected style to permit easy and quick insertion of center sections for longer booms. Straight or gooseneck tip extensions are available. Additional features include a loading platform on the front of the carrier to carry loads in transit; two telescopic-style outriggers with floats; automotive-style night lights on the superstructure; head, parking, stop and tail lights; clearance lights; tow hooks at the front of the carrier; a complete set of instruments and tools; and hose for tire inflation operating from a special outlet at the air tank.

Further details on this new Lorain self-propelled 20-ton crane may be secured direct from the manufacturer.

Highway Conference Bulletin Published

The Proceedings of the Fifth Annual Highway Engineering Conference held at the University of Utah on February 29 and March 1, 1944, have recently been published. The subject of the conference was post-war planning, and Federal, state and city officials urged that we "plan now, estimate now, and blueprint now" so as to be able to meet the conditions that will arise after the war is won.

Copies of this bulletin, which contains all the papers presented at the conference, may be obtained by writing to A. Diefendorf, Head of the Department of Civil Engineering, University of Utah, Salt Lake City, Utah.

Hercules Powder Co. Announces Promotions

Luke H. Sperry, Chief Engineer since 1939, has been appointed to the post of Director of Engineering by the Hercules Powder Co., Wilmington, Del., and Ernest S. Wilson succeeds him as Chief Engineer. Mr. Sperry has been associated with Hercules for twenty-six years and became a member of the Board of Directors in 1941. Mr. Wilson joined the Hercules staff in 1923 and was General Superintendent of Hercules paper makers chemical plants from 1937 to 1939. Previously he had served with the Delaware State Highway Department and the Wilmington Marine Terminal.

WARD LaFRANCE TRUCK DIVISION
GREAT AMERICAN INDUSTRIES, INC.
ELMIRA GAI NEW YORK

MEMORANDUM TO THE ADVERTISING AGENCY

FROM: A. Ward LaFrance, Vice President
Great American Industries, Inc.

SUBJECT: WARD LA FRANCE TRUCKS FOR FLEET OWNERS

As you know, there are some interesting, perhaps revolutionary, ideas under development here at our Elmira plant, and I know you can't wait to tell prospective users about them. That is understandable. But please keep this clearly in mind:

Motor truck fleet owners are practical people. They are badly in need of replacement vehicles, and they are interested in the proved ideas which can be incorporated in trucks We have some fundamentally important things to tell these gentlemen, so let's not waste paper on gaudy promises and fanciful pictures of beautiful, streamlined dreams of postwar models.

Let's try to get the fact across that Ward LaFrance trucks have a twenty-five year reputation for being good trucks. Let's admit frankly that Army Ordnance engineers have increased our know-how and made it possible for us to build still better ones after the last M-1 Heavy Wrecker has been delivered.

Fleet owners should be particularly interested in our new policy of concentration on their needs. This is of great importance because it will enable us to engineer and build vehicles to their exact needs. Fleet owners will recognize that this policy will result in a truck which will out-perform and outlive standard production models in a great majority of cases. Chances are, however, people will assume such trucks will cost too much. If you people in the agency can persuade fleet owners to get the facts from our engineering staff, that is all we ask of you. We can demonstrate clearly the fundamental economy of the new Ward LaFrance policy to any fleet owner's satisfaction.

A. Ward LaFrance.

A. Ward LaFrance.

GREAT AMERICAN INDUSTRIES, INC., GENERAL OFFICES, MERIDEN, CONNECTICUT
DIVISIONS
CONNECTICUT TELEPHONE & ELECTRIC DIVISION, MERIDEN, CONNECTICUT
WARD LaFRANCE TRUCK DIVISION, ELMIRA, N.Y.—FACTORY BRANCH, 139TH ST. & EASTERN BLVD., NEW YORK
VIRGINIA RUBATEX DIVISION, BEDFORD, VIRGINIA
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USE RIGHT BUCKET FOR THE JOB

Hayward makes all four — clamshell, dragline, electric motor, orange peel. A Hayward recommendation is unprejudiced.

HAYCO

THE HAYWARD CO., 32-36 Dey St., New York

Hayward Buckets

Preparing New Base For Old Maine Route

(*Continued from page 7*)

four sides. These were backed by 2 x 4 studs spaced at 2½ feet. On the bottom of these forms were 2 x 4 wales while across the top the studs were held in place by ¾ x ⅛ x 16-inch-long iron bands. Curved sections into side streets are all on a 10-foot radius. On long curves, the forms were not sprung but were carried in 10-foot chords which resulted in a smooth alignment with no perceptible breaks.

The concrete mix was 1:2:4, the washed sand and gravel coming from a commercial plant in Houlton. A Jaeger two-bag mixer was used, and the concrete was delivered to the forms in standard 2½-cubic-foot wheelbarrows with rubber tires. Two men spaded against the sides of the forms to prevent honeycomb.

Laying the Base Course

After the sub-base of the roadway was rough-graded, the 18-inch gravel base course was laid. The gravel came from a local pit 2½ miles from one end of the job. Another Lorain 75-B 1½-yard gas shovel dug the gravel and fifteen International trucks of 3 and 4-yard capacity did the hauling. The gravel was placed in 8-inch layers, coarse or fine as it came from the pit. The trucks dumped their loads and the gravel was spread roughly by two bulldozers mounted on an International TD-9 diesel tractor and an Allis-Chalmers HD-10. A Galion 101 power grader did the finish grading. A Galion 10-ton 3-wheel steel roller and a Galion 10-ton tandem steel roller compacted each layer first and then traffic was allowed over it. When thoroughly rolled, the three 8-inch layers of gravel had been reduced to the 18-inch required thickness. Traffic was maintained during these operations, half the roadway width being done at a time.

Portable Stone Crusher

For the 5-inch layer of crushed stone, the contractor used a Universal portable crusher weighing 37 tons, with a capacity of 350 yards of stone per day, and powered by a Caterpillar diesel engine. This was installed at the gravel pit. For material, the contractor used field stone which the neighboring farmers were so glad to get rid of that they often hauled it to the crusher themselves and dumped it there. The stone went first to a jaw crusher and then to vibrating screens of 2½, ¾ and ¼-inch sizes. The stone required was mixed crusher-run from ¾ inch to 2 inches. Everything that passed the ¼-inch screen was classed as dust and was discharged at one side by a separate belt. The desired mixed sizes came out the other side on another discharge belt.

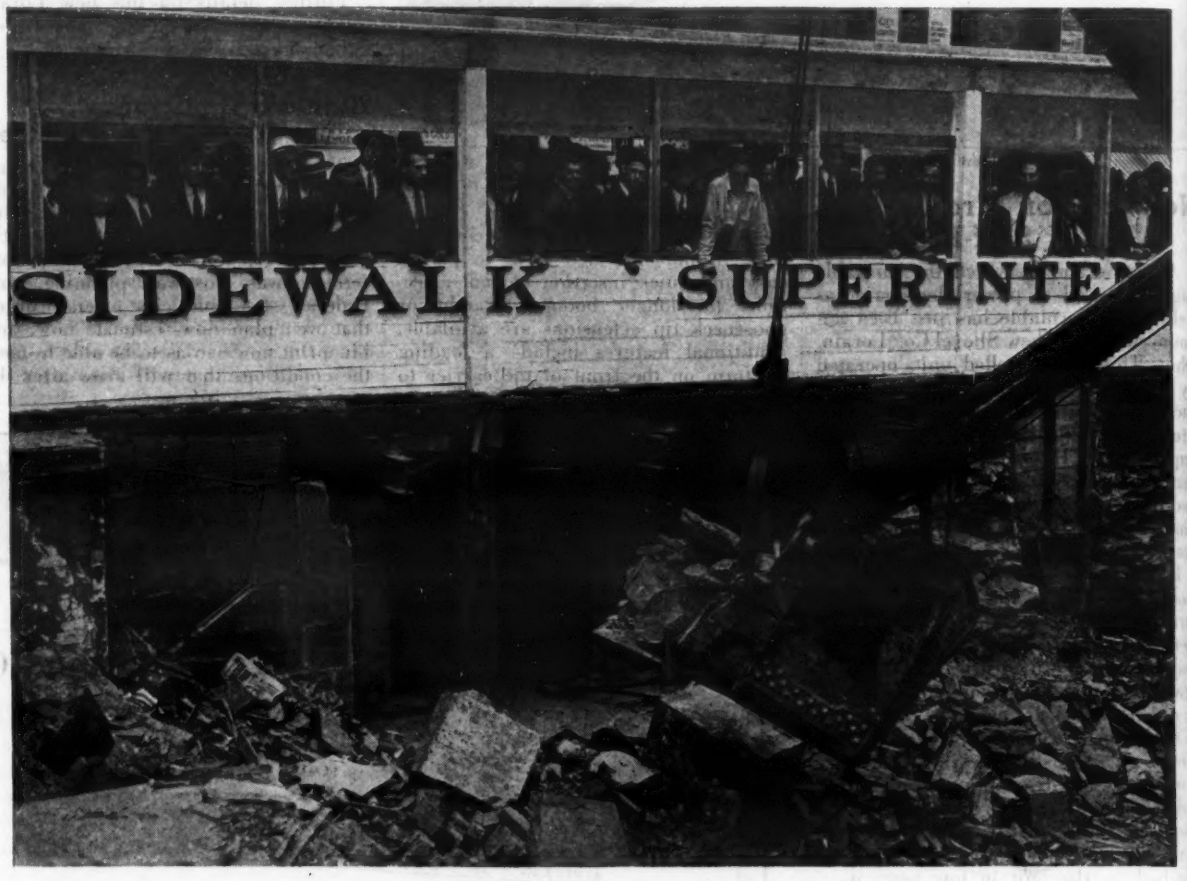
Macadam Foundation Course

The paving on this project will be completed next spring. A 6½-inch layer of the crushed stone will be spread and shaped carefully to grade and a parabolic crown of 4 inches and then rolled. After rolling, any low spots detected will be filled in and rerolled. This rolling reduces the layer to the specified 5-inch thickness. Next a 1-inch blanket of crusher dust will be spread, rolled and broomed to fill in the voids in the crushed stone until the base can not take any more. Then the section will be opened to traffic and as bare spots appear more dust will be thrown on to fill in the interstices. After that the roadway surface will be rotary-broomed until the stones show, the dust being swept off to the shoulders.

Penetration Top Course

The next step will be laying the 3-inch surface course. A 4-inch layer of stone will be spread and rolled, with any depressions spotted and filled in by hand with a stone fork. The specifications require that 95 to 100 per cent of the

(*Concluded on next page*)



The Toughest show in Town

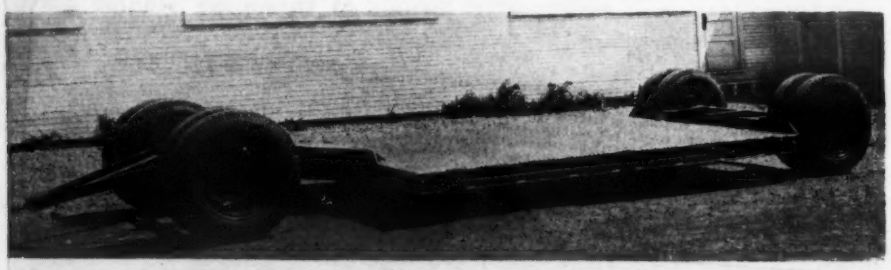
Remember that famous foundation job in New York, the one where a ringside view was provided for the "sidewalk superintendents"? The big boss knew human nature. He knew that almost everybody likes to watch the power shovels and hear 'em grunt and puff and ram their teeth into packed dirt and rock.

Today's modern shovels handle boulders like pebbles. And much of their tremendous strength comes from the rugged, sinewy, wire-rope tendons in boom lines, hoist lines, crowd lines, etc.

Those ropes have to take a beating, and that's why Bethlehem Wire Rope is found on so many tough excavating and earth-moving jobs. For this unusually severe service, use Purple Strand; for Bethlehem's Purple Strand grade is built of the strongest, guttiest steel that ever goes into wire rope. The operating lines should be Form-Set (preformed) to assure maximum flexibility and resistance to bending fatigue.

Whatever your job, remember that Bethlehem makes a wire rope to suit your conditions and your budget—sound, dependable rope for every purpose. You can't buy finer rope anywhere.

When you think WIRE ROPE . . . think BETHLEHEM



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7, 10, 15 & 20-ton capacities

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USE OF PAPER!
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To Aid the WAR EFFORT—
☆ Every pound of paper must be used wisely.
☆ We must salvage paper normally thrown into the waste basket.
☆ Avoid waste. Salvage paper for military use.
CALL A COLLECTOR!

Access Road Rebuilt To Serve Busy Airport

(*Continued from preceding page*)

stone for this course pass a 2-inch sieve and 0 to 15 per cent pass a ¾-inch sieve.

The first shot of quick-breaking emulsified asphalt will be applied to the 3-inch compacted top course of stone at the rate of 0.75 gallon per square yard at a temperature of 90 to 100 degrees F. This will be covered with a thin layer of key stone passing a ¾-inch but retained on a ½-inch screen, just sufficient to keep the roller wheels from sticking. This will be followed by a good rolling and the section closed to traffic for half a day.

The second shot of the same emulsified asphalt will be applied at the rate of 1 gallon per square yard, followed by the same process of key stoning and rolling. The road will be closed for 24 hours, and then opened to traffic for two or three days or as long as the stones do not loosen and kick out. Then the surplus stone will be swept off the road by a rotary broom. A seal coat of the emulsified asphalt, 0.3 gallon per square yard, will be applied next, followed by a thin layer of pea stone, passing a ½-inch screen and retained on a No. 4 screen. This will be rolled and in half a day the identical process of seal coat and pea stone repeated. After closing the road for a few hours to set, it will then be opened to traffic.

Parking Strips

The shoulders or parking strips will be 7 feet wide, with a 24-inch gravel base which was laid the same time as the base course for the roadway. A premixed 2-inch gravel surface course of screened and washed gravel, 100 per cent passing a 1¼-inch screen and 35 to 40 per cent passing a ¼-inch screen, will be used.

As this size of gravel passed over the vibrating screens, it was washed by a 3-inch stream of water and then stockpiled. It will then be mixed in a concrete mixer with 12 gallons of RT-6 tar to 1 cubic yard, loose measurement, of gravel. The drum of the mixer will be heated by a blow torch to prevent the tar from hardening and sticking to the sides. Mixing will continue until all particles are thoroughly coated with the tar. Then the mixed material will be stockpiled for a week, hauled out and dumped on the shoulders, spread by the graders, and rolled. A 3-inch layer of loose material will be put down in order to get a 2-inch course. After rolling, a seal coat of 0.15 gallon of RT-6 tar per square yard will be applied, followed by a thin layer of stone chips from ¼-inch down to sand. After rolling the chips, the shoulders will be ready to take traffic.

Equipment Care and Labor

Repairs to equipment on the job are being speeded with a Lincoln 400 portable electric arc welder and a Purox oxygen-acetylene welder. Labor has been the big problem, however, as the contractor could not compete with the high wages being paid locally. Of the thirty-five men employed, twelve are Jamaicans, part of a group originally brought to Maine from the West Indies by the Federal government to alleviate the labor shortage in the potato fields and pea canneries of Aroostook County. The contractor has requested the use of German prisoners of war from the government.

Quantities

The major quantities involved in this $130,000 project, according to the engineers' estimate, are:

Item	Amount
Excavation, unclassified	30,760 cu. yds.
Gravel base course	19,000 cu. yds.
Crushed-stone base course	3,150 cu. yds.
Bituminous-macadam surface course (Emulsified asphalt penetration method)	2,100 cu. yds.
Emulsified asphalt C, furnished and applied	65,000 gals.
Bituminous material, Type B	22,000 gals.
12-inch plain-concrete pipe	548 lin. ft.
15-inch " " "	1,900 lin. ft.
16-inch " " "	116 lin. ft.
24-inch " " "	864 lin. ft.
Concrete curb	15,722 lin. ft.

Personnel

The general contractor is Herbert E. Sargent of Stillwater, Maine, with M. E. Greaves as Superintendent. Edward Emery of Sanford, Maine, has the contract to furnish and apply the bituminous material. Archie V. Everett is Resident Engineer for the Maine State Highway Commission, of which Lucius D. Barrows is Chief Engineer.

Convertible Shovel For Post-War Jobs

A new ½-yard shovel, convertible to crane, dragline, or pull-shovel service, and also available as a Cruiser Crane with truck or rubber-tire mounting, has recently been announced by the Koehring Co., 3026 W. Concordia Ave., Milwaukee 10, Wis. Many new features have been incorporated into this new excavator for greater speed, increased capacity, easy operation, and low maintenance costs, according to the manufacturer who announces that orders for these units are now being accepted on a priority basis for shipment when present military needs are terminated. This is only one of many post-war models which Koehring will have available for civilian requirements in the post-war period.

The new Koehring 205 shovel.

The major design improvements in the Model 205 ½-yard shovel include the use of the same boom for either shovel or pull-shovel operation, trigger-fast dipper trip, independent unit traction gear case, easily removable machinery units, instant travel reverse, spacious walk-around area, and head room in all parts of the cab.

Complete information on this new 205 Koehring shovel may be secured direct from the manufacturer. Just mention this publication.

"BICKNELL BETTER BUILT"

PAVING BREAKER TOOLS

We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

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BICKNELL MANUFACTURING CO.

12 LIME STREET ROCKLAND, MAINE

LITTLEFORD SUPPLY TANKS

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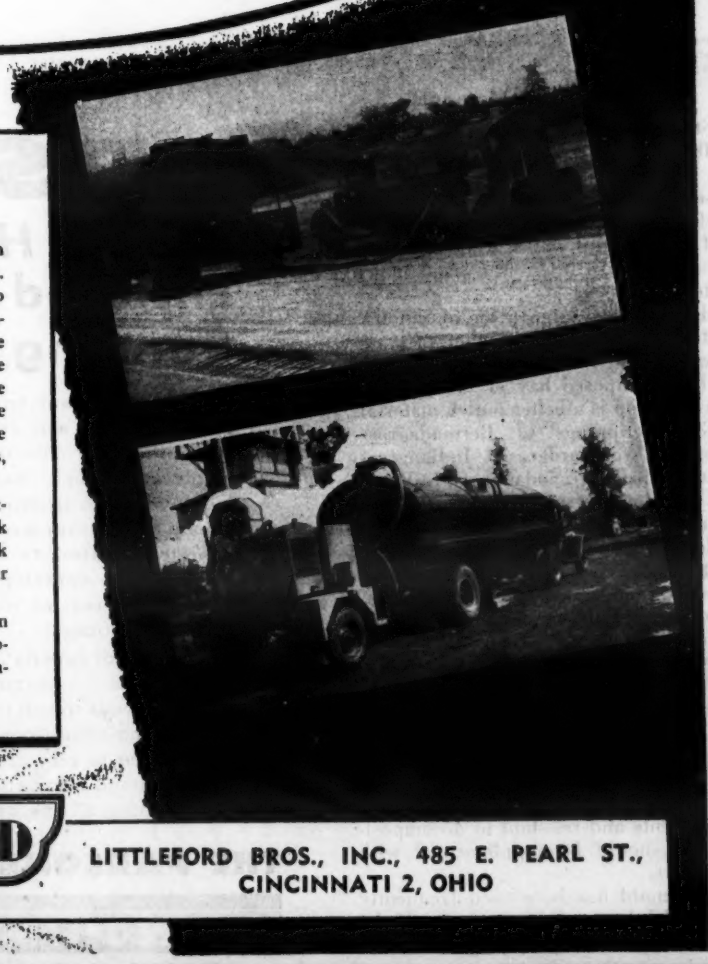
Haul Asphalt, Tar, Road Oils, or Emulsion to the job in a Littleford Supply Tank. Don't let the haulage problem slow up your application work—keep the Distributors spraying while the Supply Tanks make the long hauls. Littleford Supply Tanks are designed to do the material hauling more efficiently because they're equipped to take care of all types of materials. They are made with or without heating systems, transfer pumps, etc.

The new Littleford Frameless Construction eliminates the trailer frame; the tank is self supporting; the cost is less; the tank has better load distribution and lower center of gravity.

For Better Post War Road Construction and Maintenance, use the best in Equipment, use Littleford Black Top Road Construction and Maintenance Equipment.



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BLACK TOP ROAD MAINTENANCE EQUIPMENT SINCE 1900

LITTLEFORD BROS., INC., 485 E. PEARL ST., CINCINNATI 2, OHIO

Use of Mulching Aid to Roadsides

A Protective Device That Stimulates Growth While It Prevents Erosion; Types Of Materials Used and How

By LAWRENCE OLSON,
Landscape Engineer

✦ OF all the mechanical devices now employed to provide favorable opportunities for the establishment of vegetation on highway slopes, probably the most generally applicable and simplest that has yet been developed is the use of mulches. Mulch alone, without planting or seeding, has proved its worth as an erosion-control measure.

Mulch has the advantage of breaking the force of heavy rains which, in clay soils particularly, seal over the pores of the soil and cause greater water run-off. It lessens winter freezing, thawing, and heaving. It increases the amount of water entering the soil and also reduces the evaporation loss of soil moisture. It reduces to a minimum erosion by wind or water and tends to create and maintain good soil structure, making both heavy and light soils more like loams. It supplies energy-producing food for soil bacteria, and it makes and keeps some of the plant foods, especially phosphorus, more available than they otherwise would be. It serves as a storehouse for nitrogen, both for that contained in the mulch material and for that naturally present in the soil.

The following table prepared by Duley and Russell appeared in the August, 1939, issue of the *Journal of the American Society of Agronomy*. It is republished here as conclusive evidence in the much debated question of the value of mulch material.

Effect of Straw and Different Tillage Treatments On the Storage of Water in the Soil

Plat No.	*Treatment	Rainfall Conserved Surface Inches	Rainfall Conserved Per Cent	Depth of Water Penetration Feet
1	Straw, 2 tons disked in	6.92	38.7	5
2	Land disked, no straw	3.49	19.5	4
3	Straw, 2 tons on the surface	9.72	54.3	6
4	Straw, 2 tons plowed in	6.12	34.2	5
5	Land plowed, no straw	3.71	20.7	4
6	Decayed straw, 2 tons plowed in	3.12	17.4	4
7	Basin listed	4.95	27.7	5

*A second application of straw was made to these plats on August 9, 1938. Test conducted by V. L. Duley and J. C. Russell between April 23 and September 8, 1938, on a heavy subsoil silt loam with a slope of about 5 per cent. During this time 17.9 inches of rain fell.

Types of Mulch Materials

Straw used as a mulch should be stalks of wheat, rye, or oats, and should be reasonably dry. Partially decomposed straw of a previous year's crop is preferred. Straw manure, well rotted and free of corn stalks, wood shavings, or other coarse litter, is a good mulch material.

Hay obtained from fields of timothy, redtop, mature brome, Sudangrass and others should be reasonably dry. Partially decomposed hay of the previous season's crop is a better mulch material.

Grass clippings of Bermudagrass, bluegrass, orchardgrass, Indiangrass, brome, purpletop, Sudangrass, little and big bluestem cut just when the seed is nearly ripe make particularly good mulch. In some states the highway departments have established their own nurseries to grow little and big bluestem, brome, purpletop, and other grasses for this purpose.

Peat moss is, of course, an excellent mulch. Sphagnum moss slightly decomposed, fibrous and spongy in character and of slightly acid reaction, air dried and not brittle and water absorbent, has been the most effective type of peat used for mulching. As peat is deficient in nutrients and resistant to decomposition, it should be supplemented with fertilizers.

Leaf mold has been used frequently as a mulch by several states. One of the reasons for its use is the presence of secondary mineral elements for plant use, such as manganese, boran, zinc, barium, copper, and iron, which may be deficient in the soil.

The use of a very dark organic material on a light-colored soil surface will cause a greater obsorption of heat from the sun as a result of the darkened color. Damage may result in the case of winter mulches when the sheltered vegetation should be kept cool; under some conditions it is possible there may also be overheating of tender seed.

Problems of Mulching

Mulches on shoulders must be protected from displacement, as wind from passing vehicles tends to remove such materials, or water run-off will disturb them. Disking-in of a mulch or a light covering of earth is usually the answer to this problem.

Mulches on slopes and shoulders tend to be ignited by matches thrown from passing cars. If the mulch is disked or a light covering of earth placed over it, this problem is overcome. The thinner the mulch, however, the less the fire hazard.

Mulches over new seeded areas or young grass must be well loosened up when placed. As a general rule the ground surface beneath such mulches over seeding should be partly visible.

On slopes that tend to erode and on 3 to 1 slopes, or steeper, the mulch covering a seeded area should either be pressed into the ground by disking or mixed with the soil by the use of a spring-tooth harrow, forming shallow ridges and furrows at right angles to the water run-off.

Mulching Methods

If possible, a mulch should be applied immediately upon completion of the seeding, so as to prevent excessive soil-moisture evaporation. Mulch material should never be applied when the soil is dry, as it results in shallow rooting.

A heavy 2 to 4-inch depth of moist and loosely compacted straw, hay and grass cuttings, peat moss or the like, designed to prevent all weed or grass growth and to conserve moisture on the areas covered between planted vines, shrubs or trees and about the roots of such plants, furnishes a complete covering of mulch.

On the other hand, a light ¼ to ½-inch loose moist mulch of the same materials listed above will hold grass seed in place, and will prevent erosion until the seed is germinated, and will permit grass to grow through it.

Back up the men at the front. Buy—and hold—War Bonds!

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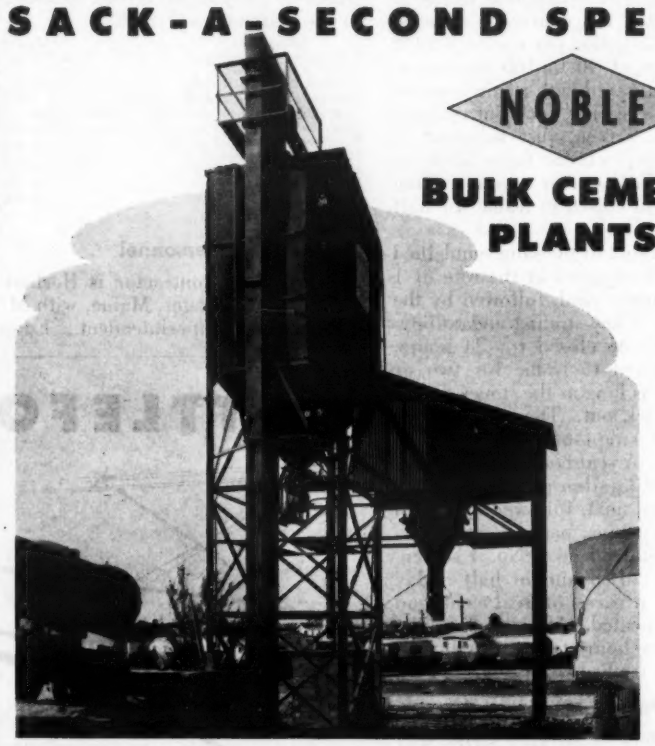

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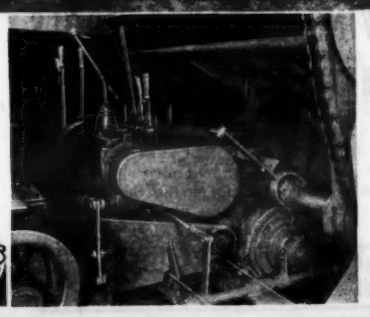
Two sets of speeds . . . five in each transmission . . . permit maximum operating speeds to suit the greatly varying digging conditions of trenching operation. Gears are enclosed, running in oil . . . cut from solid steel blanks, fitted on precision ground alloy steel shafts. Anti-friction bearings are used for mounting all the gear case shafts. Gear cases are dust tight.



THE PARSONS COMPANY Newton, Iowa

TRENCHING EQUIPMENT

Shops for the Care Of Texas Equipment

(*Continued from page 45*)

75-foot building housing the carpenter and paint shop. Due to the wartime metal shortage, extensive use of wood signs is in order and a carpenter using a Crescent power table saw and hand tools spends much of his time on their construction. Some metal from the pre-war stock in the central shop at Austin is still available and this is delivered as needed already cut to shape, drilled for fastenings, and zinc-plated for protection against the elements.

A metal vat 20 x 26 inches in plan and 29 inches deep, set over gas burners for heating, is used for cleaning and stripping old metal signs preparatory to their repainting. Kleenzall stripper is used for this operation and the residue is washed from the stripped metal plates in a wash sink set beside the stripping vat. Two racks of 1½-inch pipe with inverted T-shaped hooks welded to them at 8-inch intervals are suspended by cables and pulleys from the roof framing and when loaded with metal signs for drying can be raised out of the way.

For background coloring, Pittsburgh paint is applied by a DeVilbiss spray gun obtaining its air pressure from a Westinghouse compressor. Spray painting is done in front of a 4 x 6-foot tunnel through which a 16-inch fan exhausts the fumes and paint particles.

After drying, the signs receive their lettering by the screen process which permits rapid and economical reproduction of the legend. Wood racks provide storage for the completed signs, both wood and metal, and wall cabinets contain a stock of reflector buttons and additional paint.

Due partly to reduced demand, but primarily to efficient operation and the methods used, a sign painter and carpenter handle all the work of this department which formerly required the services of five men.

Blacksmith Shop

North of the paint shop, a smaller 24 x 30-foot sheet-metal building with a 10-foot sliding door in its southeast corner houses a Buffalo forge flanked by a Little Giant 50-pound trip hammer driven by an overhead shaft and belt system, with another power take-off to a pedestal grinder and a Champion drill press, extra drills for which are stored in a Herbrand rolling steel cabinet. Under the windows of the south wall is a full-length work bench on which is an Erie pipe vise, and a similar bench is stationary along the west half of the north wall.

At the time of our visit, repairs were under way to a Rome grader and, under a gallows frame built outside of the shop of 12 x 12-inch posts supporting a cross member of laced steel channels, a partly dismantled Caterpillar Sixty-Five tractor stood with its transmission removed and undergoing welding in the shop for which a USL portable arc welder as well as a rolling tank stand with Smith valves and torches was available, as was a four-leg circular steel welding table for supporting the work.

C. & E. M. Photo

A section of the storage yard at the District 15 offices of the Texas Highway Department. At left, the blacksmith shop, and the paint shop at the right.

Laboratory and Office

Northeast of the paint shop is a building 30 x 100 feet divided into three rooms, 40, 42, and 18 feet long, which house the District laboratory, an equipment storage space, and the office for the resident engineer in charge of work in the immediate vicinity.

The laboratory equipment includes a Sargent drying oven and a larger shop-built oven 2 x 5 x 6 feet in size. A Braun soil pulverizer, a 12 x 30 x 48-inch box for absorption tests, a shop-built machine for compacting soil samples, a pugmill 18 inches in length and 10 inches in diameter for mixing them, and a Sargent balance are all used in the complete soils investigations conducted by the laboratory. A 20,000-pound-capacity Carver hydraulic laboratory press and a 10,000-pound-capacity Blackhawk hydraulic jack set in a structural-steel frame and connected to a Brown recorder are utilized for punch tests and similar operations. A Texas Highway Department standard beam-breaking machine is also installed in this room.

Work benches, well arranged plumbing facilities including a refrigerated drinking fountain, a quick freeze cabinet, a mechanical sample shaker, a centrifuge, and numerous small items of laboratory equipment facilitate the conduct of all normal field laboratory tests. Tensile strength tests on steel and compression tests on materials beyond the capacity of equipment in the District laboratory are conducted at the central laboratory in Austin.

The central part of the building is used at present for the storage of Civilian Defense supplies and equipment,

(*Continued on page 74*)

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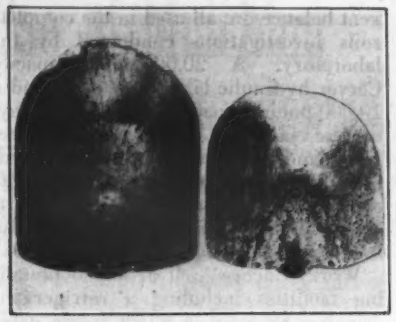


Hand shovels are still called upon to "take it" in construction and maintenance. The left-hand shovel was edged with Haynes Stellite alloy in a band ¼ to ⅜ inch wide along the under side of the point, greatly reducing the wear.

Construction Ahead From Coast to Coast

For many months Tom Callaway, Manager of Field Operations, Goodyear Tire & Rubber Co., Akron, Ohio, has been traveling through the United States with four huge "scrapbooks" which he has shown to many groups of contractors, industrial distributors, and industrial machinery manufacturers. These scrapbooks contain "evidence of pre-war and mid-war omens as may inspire post-war confidence and a willingness to plan in general construction".

Mr. Callaway reports that it is gratifying to note the understanding interest with which presentations of this message are being received, as its purpose is to assist manufacturers, distributors, and users of construction machinery to a full realization of the importance of the job that awaits them, its potentialities as a producer of national employment and income, and the ability of the construction industry to handle it.

The presentation sets forth the future needs of the nation's railroads for new terminals, the straightening of main-line tracks, universal double and quadruple tracks and lower grades to accommodate the higher speeds for which railroad operators are planning as their answer to the competition of airways and high-speed post-war highways. "The elimination of curves and grades," it is declared, "means the movement of billions of yards of dirt. It means the elimination of roadbeds that were never designed for the speeds of today and tomorrow. It means open cuts and new tunnels at $400,000 per 1,000 feet".

The coming demand for airports to make possible the expected future goal of 20,000,000 air passengers a year also is pointed out. Authorities predict 6,000 all-purpose airports within the boundaries of the United States by 1951, a 50 per cent expansion of the present objective of 4,000 airports by 1945. The pages of the scrapbooks state further, "The future of dam building is uncertain, but, like highways and airports, they ultimately become sound economic investments and add measurably to the total wealth of our nation. Dam functions, such as navigation, irrigation, flood control and public power, soon become basic factors of economic insurance. Economic planners, both sound and crackpot, seem to agree that any balanced public works program should include $1,000,000,000 annually for airports and dams."

Turning to highways, the message of the scrapbooks declares, "Urgent post-war highway needs total $16,500,000,000; necessary neglect of maintenance has speeded decay. State highway systems alone need $7,500,000,000 for after-war traffic requirements. Needed work on the vast mileage of county and local roads totals $4,000,000,000. Modernization and repair of city streets will cost $5,000,000,000. Highway adequacy and safety have yet to keep pace with automotive progress in America. We may easily have 38,000,000 motor vehicles to accommodate on our highways by 1950."

Speaking of the foreign field, and the interests of exporters, the books declare, "We can and must inspire and promote; we can and must sell the overall idea of rehabilitation and progress; we can and must sell the tools to do the big job" of rebuilding war-torn lands.

The cost of pneumatic tires for equipment to implement a $4,000,000,000 highway-airport-dam-construction program amounts to $70,000,000, an indication of the dependence of modern construction and construction equipment on synthetic and natural rubber.

In conclusion, the importance of rubber to all these operations is emphasized and, in behalf of the Goodyear Tire & Rubber Co., this pledge is made: "Your problems are our problems, and we are committed to meet and blend the service requirements of the contractor, the distributor, and the manufacturer. The mine operator and logger are not exceptions. Engineering development is on your side; highway obsolescence is on your side; post-war employment fluctuations will stimulate the cause; transportation trends are in your favor.

"We are facing a construction era vastly greater than anything we have ever imagined, a momentum created by civilization, a social and economic responsibility which civilization cannot afford to sell short".

New Hydraulic Presses Described in Bulletin

The Junior hydraulic-press line of Colonial Broach Co., P. O. Box 37, Harper Station, Detroit 13, Mich., is described in detail in a new 4-page two-color folder, Bulletin VJI-44, which contains complete specifications, descriptions, and photographs of both the bench and base types of Junior presses, available in 1, 2 and 4-ton sizes.

New accessories described include an external pressure control for limiting the maximum ram pressure; a pressure gage which can be used as an indicator of dull broaching tools or to check assembly work for fits; and a variable-speed control with which the ram speed can be adjusted to any desired rate below its maximum of 30 feet per minute.

Copies of this bulletin may be secured direct from the manufacturer.

FREE!

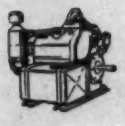
ONE OF THE MOST VALUABLE WORKS EVER WRITTEN ON PUMPS

Modern self-primers do amazing jobs in crucial places. Intimate knowledge of this "new kind of pump" is increasingly important to men who build. This clear, concise, illustrated handbook gives the facts you should know. Send for a copy.

MARLOW PUMPS
Makers of Modern Self-Priming Centrifugals
RIDGEWOOD, NEW JERSEY

SUPERFINISHED CRANKSHAFTS
another "PLUS FEATURE"
IN ALL WISCONSIN Air-Cooled ENGINES

The very ingenious, specially designed machine illustrated above, puts a mirror-smooth *superfinish* on the crank-pins of all Wisconsin Air-Cooled Engines. By combining perfectly synchronized rotating and oscillating polishing movements, absolutely uniform diameter is maintained over the full length of the crankshaft bearing surfaces.



This is just another of the many small, but *important production details* that account for Wisconsin heavy-duty serviceability and smooth, efficient operation. Just another reason, too, why *your equipment* should be powered by a Wisconsin engine.

Most H.P. per pound
WISCONSIN MOTOR Corporation
MILWAUKEE 14, WISCONSIN, U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines

ANTHONY HYDRAULIC TRUCK EQUIPMENT

Six wheelers and heavy duty trucks.

For short and long W. B. chassis.

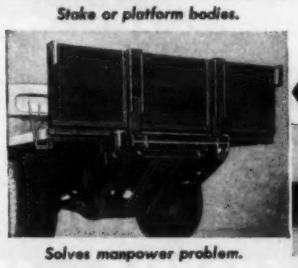
"SUPER" HYDRAULIC HOIST DUMP BODIES
sizes 5 to 30 ton capacity.

Special for wooden bodies.

MODEL "ZB" PLATFORM HOISTS
make dump bodies out of flat-bed, stake, or grain bodies.

Stake or platform bodies.

"STAKE BODIES"
"PLATFORM BODIES"
Lengths up to 20 feet.



Solves manpower problem.

"LIFT GATE"
HYDRAULIC tailgate lift for loading truck van bodies, platform bodies, etc. One man does the work of three!

Write or wire for literature and prices Nation-wide Sales and Service

ANTHONY CO.
STREATOR, ILLINOIS

ARMY E NAVY

Virginia Has Plans For Road Program

Care of Present Highways And Plans for Future Work With Depleted Personnel; Progress Being Made

By R. P. ELLISON, Executive Assistant, Virginia Department of Highways

✦ EVERY highway department faces many complex problems in the immediate post-war period, and three *musts* are constantly before highway engineers:

1. To protect the investment already made in our highway system, in spite of limited man-power, materials and equipment.

2. To rehabilitate immediately at the close of the war those highways damaged by time, the elements, and heavy war traffic.

3. To prepare plans on essential worthwhile projects and to provide adequate highways, streets, and bridges for the anticipated traffic, helping, by such provision, to relieve the post-war unemployment load.

Planning for Maintenance

The necessity for protecting our highway system, regardless of wartime restrictions, has caused many maintenance engineers to "turn gray". Since the winter of 1941-1942 it has been impossible to secure the bituminous materials needed to strengthen and waterproof the lower-type surfaces on many miles of Virginia highways. No new equipment could be purchased, and the man-power chart showed 5,700 persons working on Virginia highways in April, 1944, compared with 15,800 employees in April, 1942.

With the relaxation of restrictions on bituminous materials late in the autumn of 1943, immediate plans were made to accomplish as much protective maintenance as possible from April 15 to October 15, 1944. Because of the very limited personnel remaining with the Department, it was realized that we would be forced to enlist the aid of contractors with their organizations to repair the damages of the past winter and prepare our surfaces to withstand the traffic and the ravages of another winter. This was done and contracts were awarded covering approximately $6,000,000 of maintenance work, much of which would usually have been done by our own forces.

By careful planning, our essential protective maintenance is being accomplished.

Needed Construction

Immediately on the cessation of hostilities, the rehabilitation of many miles of road must be started. Because of deferred maintenance, deterioration by the elements, and unusually heavy wartime traffic, a large program will be needed.

By a careful state-wide survey conducted by the Virginia Department of Highway engineers, it was found that, on some of our roads, the alignment, grades, and width of surface would be adequate but that the pavements would have to be strengthened or, in some instances, replaced. These highways are those of relatively minor importance, carrying a limited volume of traffic. It is estimated that this type of work will involve a program of approximately $16,000,000 and that the plans on file will, with slight alterations, be sufficient to cover the required reconstruction.

On the survey made to determine essential projects to be included in the post-war program, the findings show that a minimum of $220,000,000 will be needed to finance properly the work planned for the first five years after the war.

The immediate program, covering 540 miles of highway at a cost of $93,000,000, includes 230 miles to be regraded and the surface widened at an estimated cost of $21,000,000; 180 miles of relocation and widening of surface on highways that for the greater portion of their length have satisfactory alignment, width, etc., at an estimated cost of $22,000,000; and 130 miles of new location with modern design pavements at an estimated cost of $50,000,000.

The ultimate program also includes 76 miles of highway on the tentative Interregional Highway System at an estimated cost of $12,000,000; 115 miles

(*Concluded on page 78*)

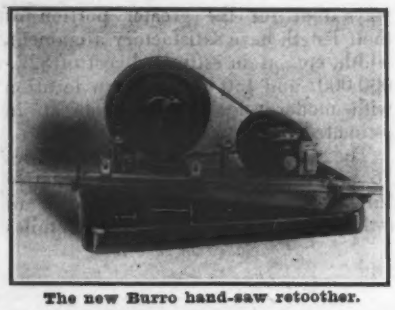
GW
GAR WOOD
ROAD MACHINERY
Make your blueprinted plans NOW for postwar earthmoving . . . make sure Gar Wood 2 and 4 Wheel Hydraulic Scrapers, 4 Wheel Cable Scrapers, Hydraulic and Cable Dozers and Trailbuilders, Hydraulic and Cable Rippers and Tamping Rollers are included in your Equipment Plans. This is double assurance that your planning is up to the minute.
Look to Gar Wood and BE READY
GW ROAD MACHINERY is Sold Through ALLIS-CHALMERS Dealers Everywhere
ROAD MACHINERY DIVISION
GAR WOOD INDUSTRIES, Inc.
DETROIT 11, MICHIGAN

The Rud-o-Matic Tagline is operated on a spring principle and maintains at all times a positive tension sufficient to steady a clam shell bucket under any and all conditions, and will operate perfectly with the boom at any angle. It eliminates all the grief usually encountered with the average tagline as there are no weights, tracks, pins, carriages, or sheaves to wear out or to get out of order. Because of the large bearings and fewer sheaves, the saving on cable alone would eventually pay for it.

Tagline is complete with fair lead and cable attached and can be installed in less than one-half hour. Most of the crane manufacturers have adopted the Rud-o-Matic as standard equipment.

McCaffrey-Ruddock Tagline Corp.
2121 E. 25th St., Los Angeles 11

Carey Elastite EXPANSION JOINT
Standard In Concrete Construction for 31 Years
ECONOMICAL and EFFICIENT
Asphalt Joint
Fiber Joint
Sat Grade Fill
THE PHILIP CAREY MFG. CO.
Dependable Products Since 1873
LOCKLAND, CINCINNATI, OHIO



The new Burro hand-saw retoother.

Automatic Retoother Extends Hand-Saw Use

A compact automatic punch and die mechanism which will put a new set of teeth in an old hand saw in less than one minute has been announced by the Burr Mfg. Co., 3392 Robertson Blvd., Los Angeles, Calif. This Burro automatic hand-saw retoother is mounted on an 11 x 24-inch base and consists of the punch and die mechanism, a drive wheel, a feed mechanism, and guide blocks and clamps with adjustable spring tension. A ¼-hp electric motor drives the machine. Five index bars are supplied to provide any desired cutting for either cross-cut or rip.

To retooth a hand saw, the handle is first removed, the proper index bar is selected and placed in the saw carrier, and tightened in place with two clamps. Then the bed-plate is swung to the proper angle for cross-cut or rip saws and tightened. The saw and carrier are then inserted into the machine from the left until the index bar is under the pawl and the power is turned on. The teeth are punched out one at a time at the rate of 240 per minute until the retoothing is completed. It is unnecessary to cut or grind off the old teeth as they come off as chips. The new teeth are then ready for setting and filing.

Complete information regarding this machine may be secured direct from the manufacturer by mentioning this item.

Better Highways Will Aid Brazil Economy

Transportation is the keystone to the economic development of Brazil, according to Dr. Clovis Pestana, Director General of the State of Rio Grande do Sul's Highway Department, who, in a recent interview in Washington, announced that his own state in southern Brazil plans to double its existing highway mileage as soon as the war ends. Dr. Pestana, who is visiting the United States for three months at the invitation of the Office of Inter-American Affairs and the American Road Builders' Association to inspect the manufacture of road building machinery and study highway construction, said that, although the war has halted road construction in his state, more highways were built there in the five years preceding 1943 than in the previous forty years.

Before a Highway Department was organized in the state of Rio Grande do Sul in 1938, less than $3,000,000 had been spent on the state's highways. Since 1938, $12,500,000 has been spent by the state through the Highway Department, which is the only autonomous highway department in Brazil. During that period, more than 3,100 miles of highways were built, including 1,242 miles of all-weather roads, 1,242 miles of good dirt road, and 621 miles of dry-weather road.

Dr. Pestana, who plans to study state highway department organizations, general highway construction, and the manufacture of road machinery during his visit to this country, says that his Department's plans for the future call for a network of 6,213 miles of state highways, which is double the existing mileage now maintained by the state. The Department plans to obtain a loan of $10,000,000 from the State of Rio Grande do Sul for future highway construction, the funds for the loan to be obtained through a new land-improvement tax assessed on land contiguous to the new highways.

The most important new construction is the completion with an all-weather surface of the Mauricio Cardosa Highway between Uruguayana on the Argentine border and Porto Alegre, a distance of approximately 435 miles. This highway serves temporarily to connect the alternate Pan American Highway route through northeastern Argentina with the main Pan American Highway on the seacoast at Porto Alegre. As part of this project, the route will be given an asphalt surface and a bridge will be built over the Ibicui River. This structure will be 1,312 feet long and will cost approximately $350,000.

In addition to the program of road construction to be carried on by Rio Grande do Sul, the Federal government will, besides constructing the Pan American alternate transversal route between Uruguayana and Porto Alegre, improve the Getulio Vargas and Trans-Brazilian Highways which run longitudinally from the Uraguayan border through the state of Rio Grande do Sul and thence to the Amazon River. The Federal highway construction in Rio Grande do Sul is part of the national plan for Federal highways approved by President Vargas which contemplates a total network of 20,741 unduplicated miles, of which more than one-half is to be constructed.

Giant Highway Program Subject of ARBA Meeting

First-hand authoritative information on the status of plans for the biggest program in highway history will be available at the Forty-Second Annual Meeting of the American Road Builders' Association to be held at the Stevens Hotel in Chicago January 16-19, 1945.

Among the many questions under discussion will be the size of the post-war highway program, Federal-Aid, surplus equipment, the status of planning, effect of new materials and improved equipment on design and construction, wage policies, the stability of the contract system, the development of air transportation and facilities, and many others.

In addition to the regular sessions, the Old Timers' Party will be held Tuesday evening, January 16, and the annual banquet on Wednesday evening, January 17. Reservations for either or both of these events should be made promptly.

New Salesmen at Fruehauf

Two new men have been appointed to the sales and service staff of the Fruehauf Trailer Co.'s Portland branch, W. J. Jarvis, Branch Manager, has announced. The new representatives are Ivar R. Madsen, graduate of Oregon State College and formerly associated with firms dealing in automobile and truck finance; and Merle B. Shannon, who during the past ten years was employed by the Standard Oil Co. of California. These men will handle sales and service on all types of Fruehauf heavy duty trailers.

A NEW MACHINE FOR A NEW ERA

VIBER SLAB

ENGINEERS know that a period of unparalleled construction activity begins when Victory is won. But plans, methods, equipment can't wait for the final gun. Viber Company, pioneer in producing concrete internal vibration equipment, has slanted its research and experimentation to the new specifications of postwar. One such development is the VIBER SLAB, a multiple, high-speed internal concrete vibrating machine specially designed to help build tomorrow's heavy-duty airport runways, aprons, highways.

Tests already performed definitely reveal: (1) VIBER SLAB will vibrate the stiffest concrete on slabs as fast as it can be economically placed on the sub-grade. (2) The battery of "Vibers" will vibrate the ENTIRE DEPTH *(not just the top surface)* of super-thick slabs. (3) Viber's "Viber-ation" in low slump concrete slabs produces strengths not now obtainable with present day equipment, and at a new low cost not now approached.

Expect big things of VIBER SLAB . . . a new machine for a new era!

The new SLAB is a development based on the superior performance of famous VIBER vibrators.

In the field for years, VIBER internal concrete vibrators have been delivering constant satisfactory service under all job conditions. VIBERS speed up the job, providing the highest vibration speed in concrete—over 9500 RPM!—at 110 Volts. Easy to work with, portable, rugged—no wonder VIBER gets the call! VIBER'S simplified design with complete interchangeability of parts including power units (electric, pneumatic or gasoline) further eliminates costly delays and lowers costs. So specify VIBER-ation (not ordinary vibration) and put VIBERS on the job.

VIBER COMPANY

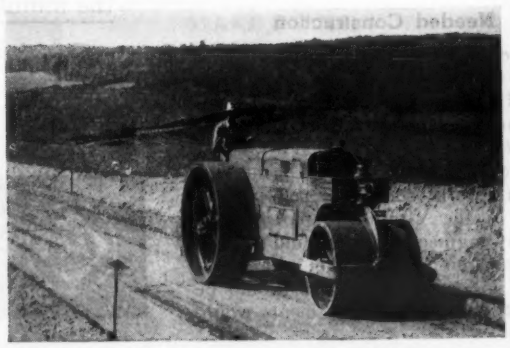
726 South Flower Street, Burbank, California

ORIGINATORS OF INTERNAL CONCRETE VIBRATION

WARCO MOTOR GRADERS and HERCULES ROLLERS

are *First-Class* Construction Equipment . . .

A WARCO Grader maintaining an Arkansas road



A HERCULES Roller on road construction in Maryland

WARCO—The Easy-to-Operate, Dependable Hydraulic Control Graders!

One man machines which do an accurate, fast job on tough construction or light maintenance. And remember—Hydromotor operation is smooth, easy operation, with minimum upkeep.

You can't beat a HERCULES ROLLER for a fine rolling job!

When equipped with the *IRONEROLL* the HERCULES becomes a tandem unit that smooths to hump-free perfection without cross rolling. It's HERCULES—for less rolling—less expense—successful results!

Write for circulars and full details

Built by

W. A. RIDDELL CORPORATION and HERCULES ROLLER COMPANY

Bucyrus, Ohio

ome Bridge Trends Forecast by Builder

(*Continued from page 27*)

om their long-established standard of l-riveted work.

Before the war, there was a trend to-ards using more metal and lighter etal for highway bridge floors. Mr. nnor looks for an increased use of hter metals for this purpose.

Army engineering has brought to the tention of many contractors the advan-ge of heavier equipment for construc-ion. Also, because of the shortage of placement parts and the difficulty of aining them, more emphasis has been aced on longer life, Mr. Connor nted out. For this reason, he believes t we shall see larger shovels and nes in the future. Bigger trucks will an bigger excavator buckets. Because formed wire rope has proved itself n war use to be longer lasting and safer o handle, Mr. Connor prophesies that it ill probably be standard on equipment.

Safety in Construction

Mr. Connor stated, "Safety will re-eive increased emphasis in all future onstruction. In delivering hurry-up war ork, we have learned that the safest is lso, in most cases, the quickest."

Simplicity of operation for all ma-hinery and equipment and more on-he-job servicing and maintenance will e the order. There will be increased chooling in accident prevention. All f these and many more will be on the ontractor's and engineer's schedule for ext year and the years thereafter.

Huge Bridge Program

This veteran bridge engineer foresees vast construction program in the days head, pointing out that Kansas alone stimates that an expenditure of more han $150,000,000 is needed on its high-ays, not including highway bridges hich would add at least $30,000,000 to hat estimate.

For the United States, the American ssociation of State Highway Officials stimates an immediate need for some 0,000 bridges to be built, widened, or ebuilt. This represents a work project of early $1,000,000,000. And the bridge otal does not take into consideration ailroad needs.

In concluding the interview, this well nown engineer who has watched so any of the country's great bridges row to completion, said:

"This gargantuan construction back-og should be an inspiration to the young en trained in Army engineering who are coming home from Europe and Asia to take our places. In 1942, when the Missouri Valley Bridge & Iron Co. converted to 100 per cent war work, I left semi-retirement to serve as consulting engineer for them. Today, at eighty, with my war job nearly completed, I am looking forward to handing over the reins to a younger man."

Goodrich Associated In Colombian Project

A new tire and tube plant, with an estimated capacity of around 100,000 tires and tubes, is being built near Bogota, the capital of Colombia, and is expected to start production about January 1. Between 700 and 800 tons of rubber will be processed annually, according to present plans, and tire repair materials and automotive accessories will be produced in addition to tires and tubes. The plant is being built by the Colombian Tire Co. in collaboration with The B. F. Goodrich Co. of Akron, Ohio.

PILE HAMMERS and EXTRACTORS

HOISTS—DERRICKS WHIRLERS

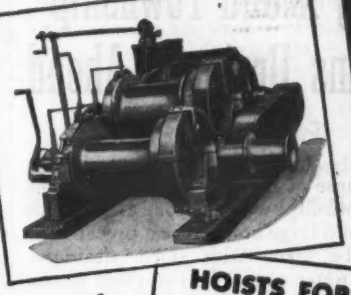
Special Equipment
Movable Bridge Machinery

Write for descriptive catalogs

McKIERNAN-TERRY CORP.
19 Park Row, New York

Distributors in Principal Cities

Hoists to Fit the Job



Lidgerwood hoists have earned a 70-year reputation for dependability and efficiency *on the job*. There's a Lidgerwood gasoline, steam, electric or Diesel hoist to fit every construction need. When you need a hoist inquire *first* of LIDGERWOOD.

HOISTS FOR:
CABLEWAYS
INDUSTRIAL PLANTS
CONTRACTORS
MINES—DOCKS
RAILWAYS

LIDGERWOOD
ESTABLISHED 1873
Manufacturing Company
MAIN OFFICE AND WORKS — ELIZABETH, NEW JERSEY

"That's My Seal of Satisfaction"

10-S MIXER
THIS MACHINE COMPLIES WITH A.G.C. STANDARDS
IT IS GUARANTEED TO HOLD AND PROPERLY MIX 10 CUBIC FEET OF CONCRETE PLUS 10% WHEN OPERATING ON THE LEVEL

YES, sir, I don't have to worry about the capacity and performance of my concrete mixers and pavers. Not when they bear that A.G.C. Rating Plate. And let me tell you, that means something these busy days with a million details to watch—and no time to spare for watching.

When I estimate a job, I know exactly what my mixer and paver capacity is. When I'm looking for mixers and pavers that will help me make exact estimates, I get the ones with the A.G.C. Rating Plate that guarantees reliability in action and production.

MIXER MANUFACTURERS BUREAU

Affiliated with the Associated General Contractors of America, Inc.

Chain Belt Company, Milwaukee, Wis.
Construction Mach. Co., Waterloo, Iowa
Koehring Company, Milwaukee, Wis.
Ransome Mach. Co., Dunellen, N.J.
The Lakewood Eng. Co., Columbus, Ohio
The Foote Co., Inc., Nunda, N.Y.
The Jaeger Machine Co., Columbus, Ohio
The T. L. Smith Company, Milwaukee, Wis.
The Knickerbocker Co., Jackson, Mich.

Long Island Township Plans Drainage Ahead

(*Continued from page 52*)

Drainage Problems

Because of the suburban character of this township, with the roads lined with small and large homes, great precautions must be taken with storm drainage. Storm water cannot be permitted to run off the road surface and find its own outlet. Costly damage suits in the past have led highway officials to give grave consideration to the problem of carrying off rain water through adequate storm sewers away from lawns, gardens, garages, and homes.

Construction of large storm sewers is usually handled by contract, while the smaller pipe is laid by the Town Highway Department. The size of the project rather than the size of the pipe is the yardstick that indicates whether the work should be done by contract or by force account. Drain pipe up to 48 inches in diameter has been laid by town crews. The drawback of undertaking these larger installations is that the town does not own the proper equipment for excavating the trenches and lowering the pipe into place which, therefore, had to be rented from contractors. The cost of such rental necessarily makes the cost of the work rather expensive and consequently such projects have been undertaken only in an emergency.

Drainage Planned Ahead

One preventive measure in this respect is the far-sighted policy of establishing profile grades for proposed roads or streets, and making these data available to land owners, builders, or real-estate developers. Serious situations are thus prevented, such as when a house is built with respect to an existing road grade which is later raised or lowered considerably, leaving the house either below grade or stranded high above the new road. This is especially important now when many large estates on Long Island's north shore are being turned over to real-estate developers for subdivision.

Strict regulations now cover such real-estate developments in the Town of North Hempstead. The promoter or developer must file with the town a plot and layout plan, profiles of all roads and streets with cross sections, plus a drainage plan. These are inspected by the Town Planning Board, County Engineer, and Superintendent of Highways for approval before actual work can begin. The layout must fit into the general plan of the community; the profile and grades have to be related to existing topography, while the drainage must be adequate and of sound construction. Furthermore a bond must be posted with the Planning Board to insure that these roads and streets are graded, paved and drained according to town specifications, and that street signs are erected when necessary.

Lima Officials Promoted

Lima Locomotive Works, Inc., Lima, Ohio, has announced the promotion of Henry Barnhart, formerly Manager of the Shovel and Crane Division, to be Vice President in Charge of the Shovel and Crane Division, and of Albert J. Townsend, formerly Chief Mechanical Engineer, who has been made Vice President in Charge of Engineering.

Paul R. Ehrgott is now General Sales Manager of the Shovel and Crane Division, in charge of domestic and export sales. Mr. Ehrgott was formerly District Sales Manager of the eastern Pennsylvania territory with headquarters at Bethlehem, Pa. He assumed his new duties November 1, 1944.

Write for Details

A TOUGH ROLLER FOR TOUGH JOBS

Pierce-Bear 2-5 Tons Variable Weights

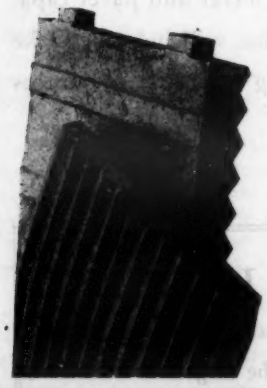
Engineered for economical operation where the going is tough. Compact, easy to operate. Narrow rear roller gives heavy-duty compression. Built-in water tanks for wet rolling. Powered with Allis-Chalmers Industrial Heavy-duty Model "B" gasoline engine.

Manufactured by

H. W. LEWIS EQUIPMENT COMPANY

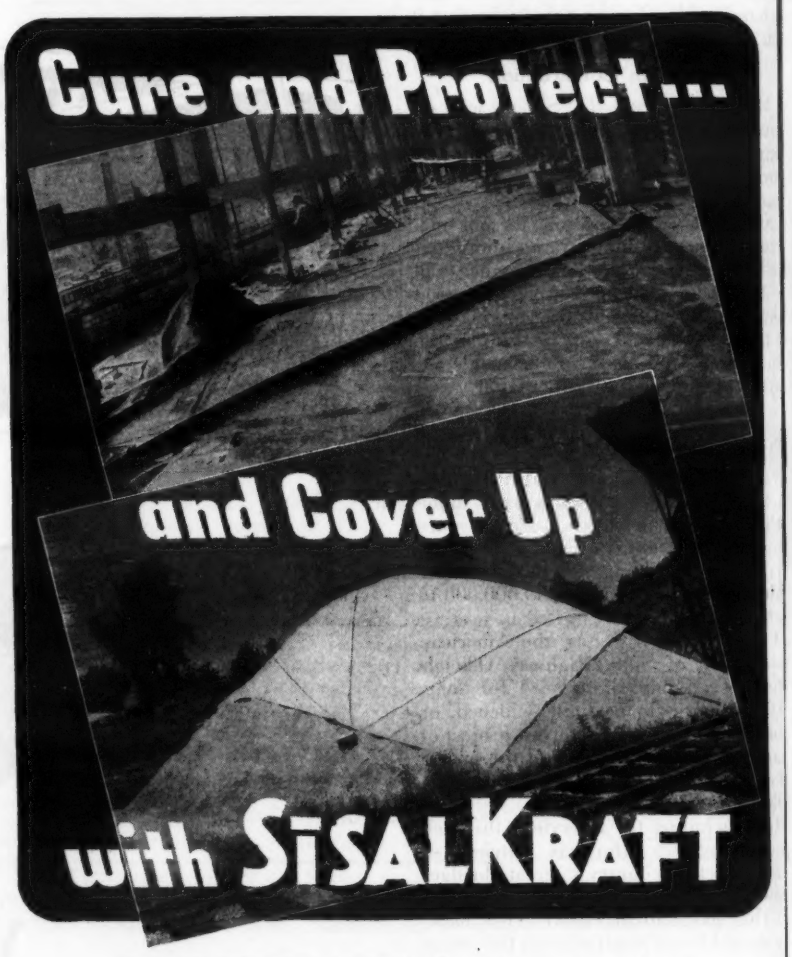
431 Hoefgen Avenue
SAN ANTONIO 3, TEXAS
Phone: Garfield 6137

HUNDREDS OF OPERATORS of heavy machinery have discovered that it pays all ways to replace worn or broken wearing parts with PACIFIC Wear-Resistant Crawler Shoes, Crusher Jaws, Scoop Lips, Cheek Plates and similar parts for most makes of machinery.



RIGHT Steel — RIGHT Fit — RIGHT Prices
RIGHT Deliveries — WRITE for Details

ALLOY STEEL & METALS CO.



THE SISALKRAFT Blankets shown in the upper illustration are being used for the *fourth time* to cure concrete floors and protect the surfaces from debris and drip. Note the splendid condition of the SISALKRAFT *seven days* after application. Note also the moisture on the concrete after the SISALKRAFT has been turned back.

Stock pile covers, made with SISALKRAFT, are lightweight, easy to handle, low in cost. SISALKRAFT is specially treated for high "wet strength" to resist scuffing and rot. This processing of the kraft paper, plus the two-way fibre reenforcement, embedded in asphalt, results in scuff-resistant and waterproof properties that give dependable protection at moderate cost.

Put **SISALKRAFT** *first on your list for concrete curing and general job protection.*

THE SISALKRAFT CO.
205 W. WACKER DRIVE · CHICAGO 6, ILL.
NEW YORK · SAN FRANCISCO · LONDON · SYDNEY

Manufacturers of
SISALKRAFT, FIBREEN, SISAL-X, SISALTAPE AND COPPER-ARMORED SISALKRAFT

Stone and Concrete To Stabilize Channel

(*Continued from page* 33)

with sand and gravel from the foundation trench, either from the stockpile of previously excavated material or from unexcavated sections of the trench ahead.

A 6-inch Rex Speed Prime pump unwatered the excavation, discharging into the diverted channel. A second 6-inch Rex was available for standby use as was a 2-inch Rex Speed Prime when the infiltration was too light to require the use of the larger pump. Pumping was continuous, 24 hours a day, and clamshell operations, both excavating and placing derrick stone in the core wall, were conducted for two 10-hour shifts. A LeRoi-powered generator furnished electricity for five S & M floodlights to facilitate night operations. Unloading and hauling of derrick stone, channel diversion, clean-up, and concreting operations were confined to daylight hours.

Concreting

When the derrick-stone core wall had been satisfactorily placed and its voids filled with inundated sand and gravel, the surface of all exposed derrick stone was cleaned by two men using water from the diverted river flow delivered under high pressure through a 2½-inch hose. The 6-inch discharge of a centrifugal pump was bushed down to deliver the water under high pressure to the hose.

When cleaning operations had been satisfactorily performed, a 1 x 12-inch wood form was set upright along the toe of the concrete cover course, held in position by 2 x 4 stakes driven into the river bottom. Concrete of 1:2:4 proportions with 5.5 gallons of water per sack of cement was delivered to the job site from the Consolidated Rock & Gravel Co. central mixing plant in three 4-cubic-yard truck mixers, four being used on the extreme hauls. The same crane used for other work at the scene of operations was equipped with a ½-cubic-yard McCaffrey bottom-dump concrete bucket which was loaded with concrete at the tail-gate of the truck mixer and swung to the desired position. There a crew of four men dumped it and shoveled the concrete into place. Two more men with a Master electric vibrator assisted in working the 3 to 5-inch-slump concrete into its final position, and four hand finishers struck it off and gave it a float finish. Hunt Process compound was sprayed on the finished concrete for curing.

U. S. Engineers Photo

A 3-foot cover coat of concrete was placed over the derrick-stone channel stabilizers in the Los Angeles River.

When a stabilizer had been completed across approximately two thirds of the full channel width, the river flow was switched to the opposite side and the operations of excavating, placing the core-wall stone and covering it with concrete were continued on the side previously used for the flow of the diverted river water.

The additional loose derrick stone was placed in proper position downstream and the stabilizer backfilled by bulldozers which then proceeded to level the excess excavated material and diversion dike to the finished grade of the river bottom.

Major Quantities and Personnel

Major bid items of this contract included the following:

Excavation	22,325 cu. yds.
Derrick stone	29,295 tons
Concrete grout	655 cu. yds.
Compacted fill	500 cu. yds.
Grouted stone apron	58 squares

The contract for the construction of these stabilizers in the Los Angeles River was awarded to the Guy F. Atkinson Co., San Francisco, Calif., on its low bid of $183,599. Operations were started on January 24, 1944. Serious delays from high water impeded the work so that the original 90-day completion date was extended by an additional 75 days expiring May 26, 1944, by which time the job was finished. Francis Jackson was Superintendent for the contractor, with Clarence Ingham as General Foreman. For the Los Angeles District Office, U. S. Engineers, who awarded and supervised the contract, the work was under the direction of the District Engineer, with Howard Norton as Chief Inspector.

Light, Motor-Powered Highway Equipment

A 16-page illustrated pamphlet has recently been issued by Gravely Motor Plow & Cultivator Co., Dunbar, W. Va., under the title "Power vs. Drudgery". This booklet shows the advantages of Gravely power equipment in soil tillage, but, of more interest in the highway field, is the use of sickle mowers and gang mowers for center strips and road shoulders, as well as the use of 48-inch-wide water-ballast rollers and Gravely snow plows and power brooms for light work on sidewalks.

Various other applications of Gravely power units are shown in this bulletin which may be secured free on request by those writing direct to the manufacturer and mentioning this review.

Use 5 to 10 dump buckets with each Load Lugger to get maximum results.

Brooks LOAD LUGGER

Start your 1945 contract jobs with the Brooks *economy system* of material handling. By equipping your trucks with LOAD LUGGERS, you can load, haul and dump in a continuous operation. It's faster and more efficient than ordinary trucks, especially on hand loading jobs . . . . for excavating, road building, construction work, quarry operations, hauling supplies, snow removal, etc. Write for Catalog No. 44 . . . . also ask about the TrucKrane boom attachment for special jobs.

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Investigate NOW!

GRAY COMPANY, INC.

MINNEAPOLIS 13 MINNESOTA

Steel Span Replaces Ice-Damaged Bridge

(*Continued from page* 30)

Near the concrete plant a trailer provided the job office and a small roofing-paper-covered building nearby was used for a repair shop. Harris gas welding equipment mounted on a truck was available for use at the shop or elsewhere about the job. This truck was equipped with an A-frame of 4-inch pipe and a Tulsa winch. Nearby was a storage yard for form lumber where a gasoline-powered band saw and table saw were used to cut lumber for the forms.

Forms for the piers and bents were made of 1 x 8-inch horizontal shiplap lined with ¼-inch plywood and supported by 2 x 6-inch vertical studs on 26-inch centers. Doubled 2 x 6's were used for wales, spaced at from 2 to 3 feet and tied together by ⅜-inch steel rods through the pier. The rods were clamped with removable cast collars held by set-screws, and cut-off, after use, ½ inch behind the face of the concrete.

Concrete for the deck slab was proportioned and mixed in the same central mixing plant used for the substructure. The concrete was discharged from the mixer into steel-bodied dump trucks, hauled out over the deck, and dumped directly on the slab forms. After final finishing, the surface was checked with a 10-foot duralumin straight-edge to show variations not to exceed ⅛ inch in 10 feet.

Each concrete batch for the deck slab consisted of the following:

Cement	188 lbs.
Fine aggregate (Passing No. 4 screen)	310 lbs.
Coarse aggregate (Passing No. 4 to 1-inch screen)	630 lbs.
Water	100-110 lbs.

Truss Erection

Steel for the trusses was fabricated by the Pittsburgh-Des Moines Steel Co., at Des Moines, Iowa, and shipped to Fallon, Mont., where it was unloaded, hauled, and erected by the John F. Beasley Construction Co., of Muskogee, Okla., and Dallas, Texas, under a subcontract. Steel for half of the bridge was stored on 3 x 8-inch timbers at the material yard south of the west end of the bridge. From this yard the steel stringers were loaded by a Northwest crane with a 30-foot boom onto an International dump truck on which a wooden rack had been erected to permit carrying the steel at a height sufficient to allow it to project forward over the top of the cab. This truck transported the stringers to where they were placed in the temporary construction bridge. The subcontractor used two trucks equipped with an A-frame and winch for transporting the members to the points of use in the permanent structure. For the longer members, the trucks were used with a two-wheel trailer.

C. & E. M. Photo

Bolting up the west span of the new Yellowstone River Bridge near Fallon, Mont., on falsework prior to riveting.

The west span, over dry land at the time of its erection, was assembled and bolted up on timber falsework. This consisted of a framed bent under each panel point. Each bent was formed of a 12 x 12-inch sill resting on four stub piles driven almost flush with the ground surface, and four 12 x 12-inch posts, two under each truss, joined by a 12 x 12-inch cap and cross-braced with spliced 2 x 12-inch lumber.

Two cranes, a Koehring 304 with a 65-foot boom and 12½-foot jib, and a Lorain with a 90-foot boom and 15-foot jib, working from the ground about 30 feet below the bottom chord, handled the individual members into position, while a crew of twelve steel workers, directed by a foreman and superintendent, joined, bolted, and later riveted them. The two crane operators, an oiler, and two truck drivers completed the erection crew, working only 8 hours per day. An Ingersoll-Rand 165-cfm portable compressor with an auxiliary air receiver furnished air for the one air wrench and one rivet gun used in setting up the truss and the three guns for final riveting.

For the other three spans, all over water, steel-truss falsework on four steel towers set on piling was used to support the trusses during erection.

Major Quantities

Major quantities involved in this contract included the following:

Structural excavation	4,230	cu. yds.
Steel bearing piles	66,500	lbs.
Driving steel piling	1,544	lin. ft.
Class A concrete	3,165	cu. yds.
Class D concrete	791.2	cu. yds.
Reinforcing steel	253,100	lbs.
Cast steel	32,300	lbs.
Carbon structural steel	2,333,900	lbs.

Personnel

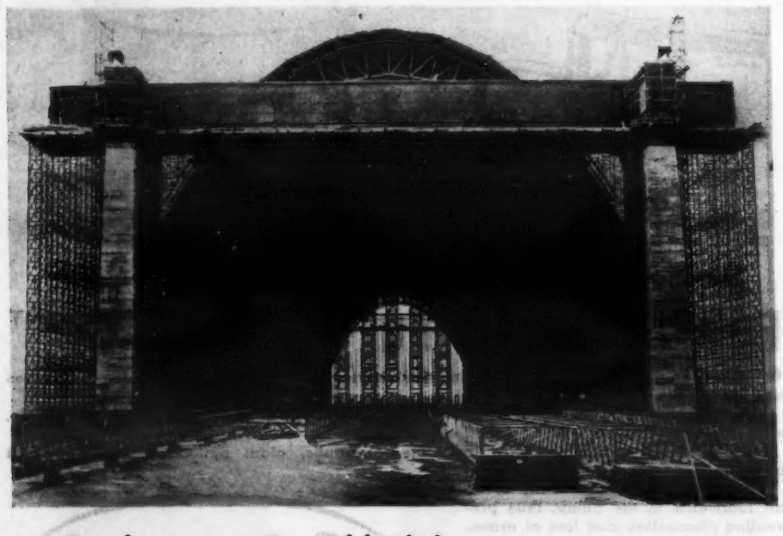
The contract for this 1,142-foot through-truss steel bridge near Fallon, Mont., was awarded to W. P. Roscoe Co., Billings, Mont., on October 25, 1943, by the Montana Highway Commission. The contract price was $395,568 and 300 working days were allowed for its completion. The final section of the deck slab was poured October 27, 1944, and the curbs were poured and the hand-rail in place by November 15, thus permitting the structure to be opened to traffic. The field painting of the steel will be completed next spring.

A. W. Sabbe was Superintendent for the contractor and S. N. Beasley was Superintendent for the John F. Beasley Construction Co., which erected the trusses. For the Montana Highway Commission, of which Howard Holmes is Chief Engineer, the work was under the general supervision of R. A. Stephenson, Bridge Construction Engineer of the Central Office at Helena, and S. B. Sanders, District Engineer of the Miles City District 8 Office. S. D. Larson was the Field Engineer in charge at the job.

Separate Truck Branches To Help Post-War Plans

As an important step in its post-war planning, and also to meet the demands of increasing activity in the truck field, the International Harvester Co., Chicago, Ill., has recently set up separate motor truck branches at several points where combination truck, farm equipment, and industrial power branches formerly had been operated.

Such recently established truck branches include Denver, Colo., I. A. Leimbrook, Manager; Indianapolis, Ind., L. W. Hully, Manager; Atlanta, Ga., C. S. DeWeese, Manager; and Kansas City, Mo., Buford Mullin, Manager. The most recent of such changes, effective October 26, is the establishment of a separate motor truck branch at Louisville, Ky., under the management of E. M. Ford, formerly Assistant Manager of the combination branch at that point.



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★ Manganese steel chains, fittings and reversible tooth points.

★ Perfectly balanced ... handles easier, fills faster ... dumps quicker, cleaner.

★ All welded construction ... for greater strength and durability.

★ Gets full load pay material every trip ... even in wet digging.

HENDRIX Lightweight DRAGLINE BUCKETS

⅜ to 20 cubic yards

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DeSoto Foundry, Inc., Mansfield, La.

The Model 411 Big Beam searchlight.

Battery Searchlight With 2,500-Foot Beam

A new portable electric hand searchlight which will project an intense beam for more than 2,500 feet or, by means of a snap-on lens, give the same volume of light over a wide area has been announced by the U-C Lite Mfg. Co., 11 E. Hubbard St., Chicago 11, Ill. This Big Beam No. 411 portable electric hand searchlight is powered by a heavy-duty shockproof 6-volt storage battery, rechargeable from any alternating-current charger, direct-current line, or light plant. Recharging is simple, clean and safe and it is not necessary to remove the battery from the container.

The lamp head can be turned in any direction and stays adjusted. The light and case are well balanced for carrying, either by hand or with a shoulder strap. It can be set down almost anywhere, and by the use of a hold-down can be securely anchored to any flat surface.

Complete information regarding this portable searchlight can be secured direct from the manufacturer.

U. S. Rubber Acquires Gilmer V-Belt Assets

The assets and business of the L. H. Gilmer Co. of Philadelphia, manufacturer of industrial V-belts, have been acquired by The U. S. Rubber Co., New York City. This purchase has been made to round out further the Mechanical Goods Division of U. S. Rubber. The Gilmer company was founded in 1907 and employs approximately 600 people. John S. Krauss, President of Gilmer, will continue in the active management of this business.

A Self-Locking Nut Entirely of Metal

A new self-locking nut soon to be placed on the market for post-war projects is the result of many years of development and exhaustive experiments and tests. It is being made from the designs of William Dzus, President, Dzus Fastener Co., Inc., Babylon, N. Y. The new nut is said to eliminate the difficulties in precision fastening as well as the need for accessories generally used to keep nuts in place. No cotter pins, lock washers or wiring are necessary, and the new self-locking nut is all metal with no plastic or rubber insertions.

In fastening the nut, the threads are not jammed but remain full and undisturbed throughout the entire length of the nut. Tests are reported to show that the new nut is stronger and will withstand higher temperatures, oil, or other disturbing elements that might affect proper functioning. Mr. Dzus claims that it will maintain its locking features regardless of the number of times it is screwed on and off.

For further information regarding the application of this nut on construction equipment and on construction projects, write direct to the manufacturer mentioning this news item.

Highway Operations In State of Illinois

At the end of 1943, Illinois had constructed 12,419.93 miles of pavement on the primary system and 1,708.28 miles on the state secondary system. Under the supervision of the State, the counties had constructed 10,421.16 miles of county highways and the cities 2,074.39 miles of city streets, making a grand total of 26,623.76 miles of highways and streets improved directly by the State or, under its supervision, by the local units.

Expenditures in 1943 included:

Construction	$20,732,779.73
Maintenance	6,960,311.58
Administration and engineering	2,372,312.71
Miscellaneous, including highway planning	388,675.21
Bond interest	4,202,260.00
Bond principal	5,022,000.00
Total	$39,678,339.23

Section 15d of the Road and Bridge Laws provided that the State of Illinois would refund to the counties one-half of the cost of constructing improvements on the state-aid road system. This provision was eliminated in 1931, but the 57th General Assembly meeting in that year made the first appropriation for the purpose of paying such refunds. Each succeeding legislature until the 63rd General Assembly has continued to pass biennial appropriations in the amount of $2,500,000 payable from the State Road Fund. The 63rd General Assembly appropriation for this purpose was $1,000,000. Disbursements to counties under the terms of this refund agreement totaled $499,697.89 during 1943. At the end of 1943, unpaid 15d refund obligations totaled $9,583,941.17.

During 1943, the state paid the counties $4,824,313.04 from their allotments of motor-fuel tax funds. In addition to these regular aids, the state disbursed to the counties $35,300.80 from the General Revenue Fund allotted for repair of flood damage to county highways.

State aids to municipalities during 1943 amounted to $5,176,278.20 from motor-fuel tax funds available for highway purposes. The state also disbursed $3,646.13 to the municipalities from the General Revenue Fund allotted for the repair of flood damage to municipal streets.

The townships of Illinois were also aided by the state during 1943 to the amount of $14,279.03 for the repair of flood damage to local roads.

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Superior Features

1. Constant Voltage
2. Tropical Insulation
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4. Flyball Governor
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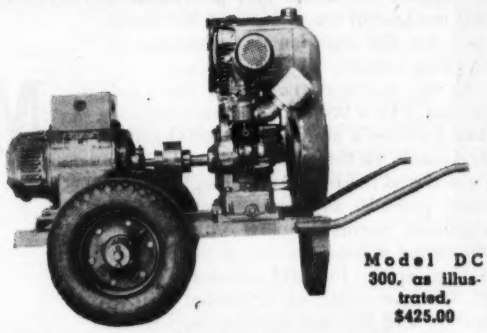

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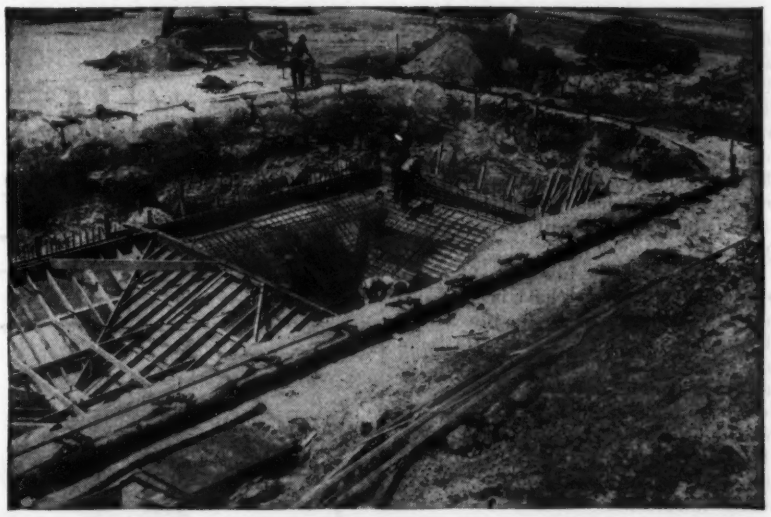

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Water level was lowered from the surface a total of 17 feet by Griffin in this job. Note the way the banks were cut to stand on a steep slope—that means dense stuff, hard to get the water out—if you don't use Griffin Equipment. And so dry was the job that they needed no additional Wellpoints to dewater an excavation 75 feet from the above. Results count—why say more?

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ONE SAFE-LINE CLAMP is designed to hold any wire rope without slipping.
WIRE ENDS ENCLOSED. No needle-sharp wire ends, nuts and bolts exposed to injure workman's hands.
STREAMLINED! Will not catch on clothing nor on mechanical apparatus. Will not foul.
HOLDS A TIGHT THIMBLE. When thimbles are used they will not loosen and fall out.

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NATIONAL PRODUCTION COMPANY
4539 ST. JEAN AVENUE DETROIT 13, MICHIGAN

District Shops Are Repair Headquarters

(*Continued from page* 65)

though before the war it was used for additional covered storage for mobile equipment.

The north 18 feet of this building houses the office of the resident engineer currently engaged in supervision of construction operations situated near the District Office, and its equipment includes desks, drafting boards, calculators and a typewriter.

Outside Storage

Approximately two thirds of the 5½ acres enclosed by a wire-mesh fence is paved with a single bituminous surface treatment on a gravel base heavy enough to support the traffic and provide dust and mud-proof travel between the buildings for the equipment in storage or awaiting repair.

In the northeast corner of the yard, beyond a 12 x 96-foot shed used for section foremen's storage, a 10,000-gallon steel tank elevated 10 feet above the ground and fed by a 2-inch displacement pump provides asphalt storage. In the northwest corner, enclosed by a fence separating it from the rest of the yard, is storage space for 100 creosoted piles, 60,000 board-feet of creosoted bridge timber, and 30 steel I-beams in lengths of 40 to 60 feet. This material is not part of the District stock but is for emergency use only on direction of the State Maintenance Engineer at Austin. On his orders, it can be transferred for immediate use to any point in this or nearby districts and provides insurance against prolonged closing of any important highway because of damage to bridges by flood, fire, or accident.

District Office

South of the shop area and 100 feet north of U.S. Highway 281 on which it faces is the two-story office building 30 x 60 feet in size. Of stucco-covered hollow-tile construction, pleasingly designed and erected in a setting of magnificent trees, grass lawns, and flowering shrubs, this office presents an attractive appearance and almost completely hides the buildings of the district repair shop lying to the north.

Between it and the highway stand two large pecan trees which have been turned into a historical shrine by the Boy Scouts of America with the erection of a fountain and monument commemorating the fact that under these trees Theodore Roosevelt took command of the newly formed Rough Riders in May, 1898, when the entire area now occupied by the office and shop buildings was a county fairgrounds.

The ground floor of this building provides office space for the receptionist and information desk at the central entrance, for the District Engineer in the southwest corner, the District foreman and the permit clerk in the northwest corner, while the east half is occupied by the District accountant and his staff of an assistant, a bookkeeper, three clerks, and a stenographer. Here all records of equipment and supplies are maintained, as well as all payroll and efficiency records of the 325 people normally employed by the District, 80 on new construction and the remainder on repair and maintenance.

The second floor provides office space for the Assistant District Engineer, the District Office Engineer, and two resident engineers, with the well daylighted north half reserved for the drafting room and storage of plans and records.

Typical Maintenance Section Shop

In an area north of the District Office and west of the shop and storage yard area, though separated from it by the enclosing fence, is situated one of the standard county warehouses typical of seven such buildings scattered over the District, which includes 1,060 miles of state highways in twelve counties. This typical building is of frame sheet-iron construction 30 x 60 feet in size with a concrete floor and 12-foot sliding doors in the sides of the opposite ends.

On the left of the front door is a 10 x 10 office space with an outside door and doors to the 10 x 15-foot storeroom built behind it and into the shop. The 12-foot passage way between end doors extends along the north wall the length of the building and in the center, behind the storeroom, is widened to the full 30 feet to provide storage for trucks or equipment undergoing minor repairs. A 3-foot-wide work bench lines the south wall.

Just inside the back door is a gasoline pump with its tank buried outside and a water hydrant with hose connection. Behind this is the emergency patrol locker in which are stored together, for prompt transfer to a truck, the small tools and equipment which might be needed at the scene of a flood, tornado, fire, or serious wreck. Five members of the section organization constitute this emergency patrol, specially trained and subject to call at all times.

The typical section organization consists of a foreman, three patrolmen, an office assistant to maintain records and

(Concluded on next page)

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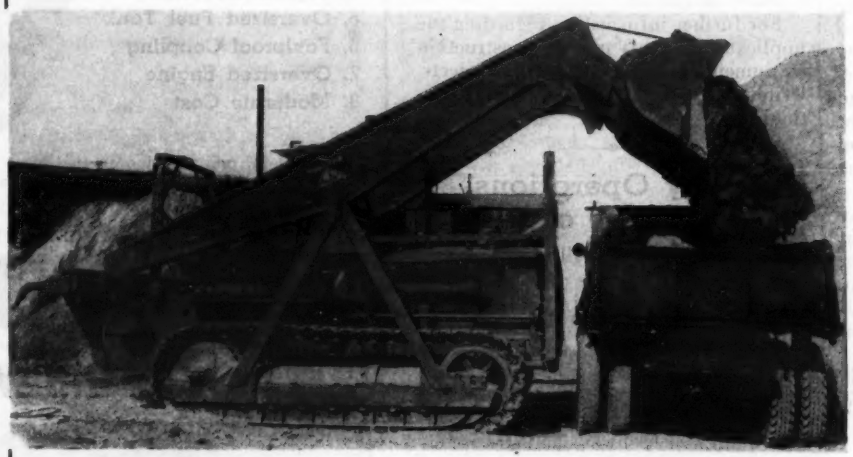

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- 100% cable control of bucket.
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PINOLA preserves your lumber.
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LIFTING—LOWERING
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DUFF-NORTON JACKS
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THE DUFF-NORTON MANUFACTURING CO.
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Representatives in Principal Cities
Your Industrial Distributor handles DUFF-NORTON JACKS

Maintenance Equipment Used in Texas Dist. 15

(*Continued from preceding page*)

keep track of stock, supplies, and equipment, and whatever number of truck crews, consisting of a driver and two to five men, as is required by the operations of the section.

Sections are established on a basis of equality of work and responsibility instead of mileage alone and vary from 90 miles of the most heavily traveled roads to 170 miles where there is less need for work per mile. An attempt is made so to plan the work that the small organization stays busy constantly rather than have a widely varying quantity of work with its demand for a fluctuating organization.

In addition to the inside storage available in the standard county shops, each one is erected on a plot of ground with 2 acres or more of available storage space for asphalt, sand, gravel, timber, and mobile equipment which is distributed around the seven county shops as the General Foreman feels the contemplated operations may necessitate. A partial list of the District equipment, which is so distributed for use and storage, includes the following:

16 Pick-up trucks	(10 Chevrolet; 5 International; 1 Dodge)
45 Dump trucks, 1½-ton	(2 Fords; 1 GMC; 25 Chevrolet; 17 International)
11 Motor graders	(5 Galion-Case; 1 Servis; 2 Duplex; 2 Rome; 1 Warco)
1 3-wheel roller 5T	(Huber)
4 Rollers, trailer	
1 Pneumatic roller	(Ingram)
1 Sheepsfoot roller	
3 Light tractors	(1 Fordson; 2 McCormick-Deering)
3 Heavy tractors	(Caterpillar Sixty and Sixty-five; 1 Allis-Chalmers diesel)
4 Air compressors	(2 180-cubic foot OK; 1 210-cubic foot Schramm; 1 210-cubic foot LeRoi)
5 Blade graders	(2 Adams; 1 Servis; 1 Russell; 1 Galion)
3 Concrete mixers	
1 Asphalt mixer	(Blystone)
8 Asphalt heaters	(400-gallon Rosco)
12 Centrifugal pumps	(2 and 3-inch; Sterling; Marlow; Barnes)
1 Power shovel	(⅝-cubic yard P & H with dragline and clamshell attachments)
1 10-ton trailer	
7 Power mowers	
1 Striping machine	(shop built)
1 Core drill	(shop built)
1 Scarifier	(Westex)
1 Roadbuilder	(Baker)
1 Tank car heater	(Grace)
1 Distributor	(Department-built, pressure, 10-foot spray bar, mounted on Chevrolet truck)

Personnel

District 15 of the Texas Highway Department has its headquarters in San Antonio and handles all surveys, plans, construction, and maintenance in Kerr, Kendall, Comal, Bandera, Bexar, Guadalupe, Medina, Wilson, Frio, Atacosa, LaSalle, and McMullen Counties. F. S. Maddox is the District Engineer and R. A. Bossy is Assistant District Engineer. The set-up described is typical of the twenty-five districts in Texas.

AGC Fall Meeting Plans for Post-War

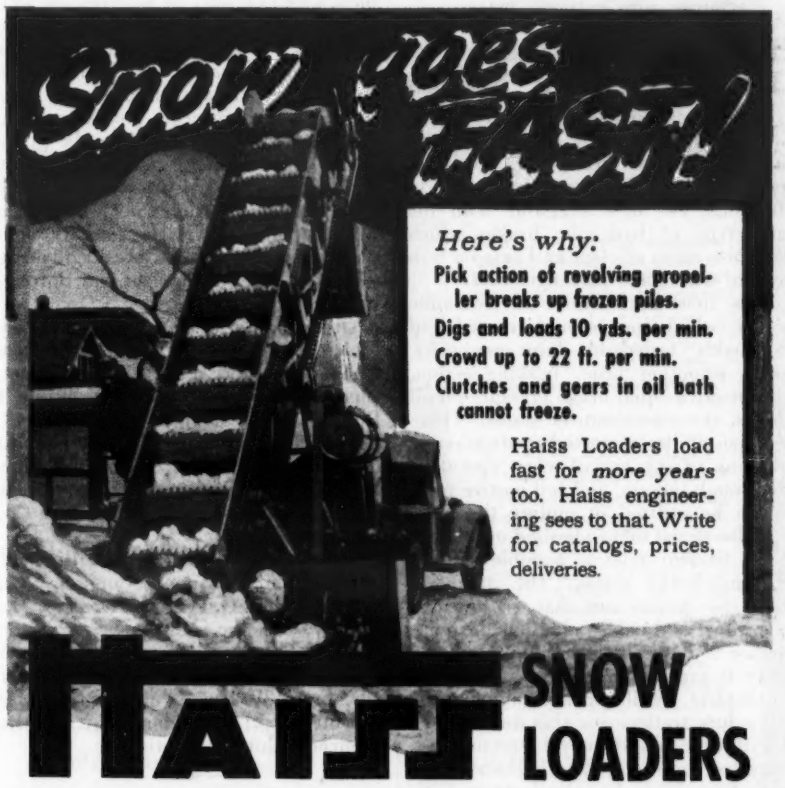
The Governing and Advisory Boards of the Associated General Contractors of America met at the Drake Hotel, Chicago, Ill., on Tuesday and Wednesday, November 28 and 29. A prominent place on the program was given to the probable developments affecting the construction industry in the reconversion and post-war periods, with particular emphasis on the necessity for getting construction programs under way during the transition from war to normal peacetime conditions.

In announcing the meeting, H. E. Foreman, Managing Director of the Association, said, "The construction industry, with its far-reaching influence on the nation's economy and general welfare, can make a contribution to peacetime reconversion comparable to its contribution to the war program. The general contracting industry is equipped and ready to resume large-scale peacetime construction, but such construction requires advance planning." Mr. Foreman pointed out that generally more time is consumed in planning projects and acquiring sites than in the actual construction, and he emphasized the need for having plans completed to the contract-letting stage, both on private and public construction projects, so that actual work can be started just as soon as materials and labor become available.

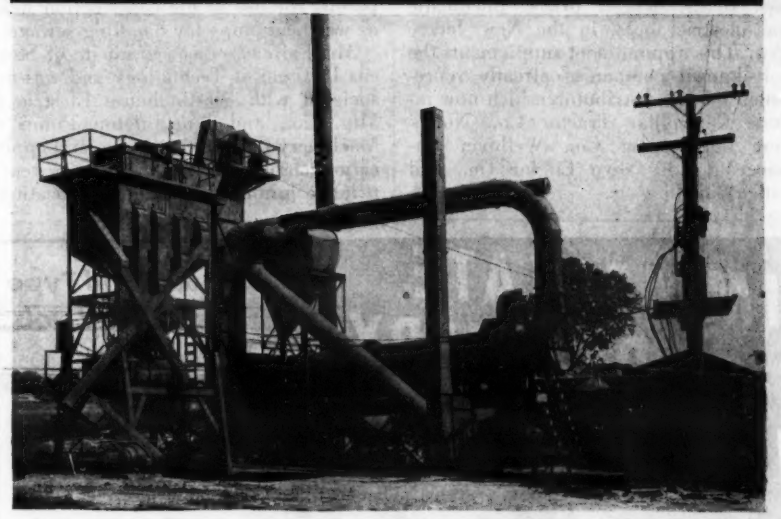
Hawaiian Engineer Aids In Work on Burma Road

The efforts of First Lieutenant Quan Y. Ching of Honolulu, T. H., in the project to open up a land route to China, have been rewarded by a promotion to the rank of Captain. A graduate in engineering of the University of Hawaii, Captain Ching is on duty with the Burma Road Engineers, whose advisory and instructional work in helping the Chinese national government's Yunnan-Burma Highway Engineering Administration reconstruct the famous Burma Road in Yunnan Province has been made possible by the Y-Force Operations Staff, an American military mission which trained and now helps supply and advise the Chinese armies fighting the Salween campaign to reopen the road and join it to the Ledo Road from Assam Province in India.

Captain Ching taught civil engineering in a south China college following his graduation from the University of Hawaii, and at the time of our entry into the war was working with contractors on the Pacific Naval Air Base at Pearl Harbor. He is entitled to wear the bronze star on his campaign ribbon.


Snow goes FAST!
Here's why:
Pick action of revolving propeller breaks up frozen piles.
Digs and loads 10 yds. per min.
Crowd up to 22 ft. per min.
Clutches and gears in oil bath cannot freeze.
Haiss Loaders load fast for more years too. Haiss engineering sees to that. Write for catalogs, prices, deliveries.
HAISS SNOW LOADERS
GEORGE HAISS MANUFACTURING CO., INC., Canal Place & E. 142nd St., NEW YORK 51, N. Y.

INCREASED EFFICIENCY and Production In ASPHALT MIXING . . .



FLUIDOMETER
Automatic Metering System —saves time, materials, insures accuracy and uniformity. For all types of asphalt.

☆ Compactness and a substantial increase in dryer capacity and efficiency are among the results accomplished by refinements in design in this recently completed H & B Portable (PA-30) Asphalt Plant. A larger fan is used, and the duct system from the dryer to the dust collector and from dust collector to the exhaustor has been redesigned. The new horizontal cyclone dust collector is more compact and efficient. The exhaust fan, motor which drives the dryer, and the speed reducer are combined in one completely assembled unit which is mounted on a separate platform. This decreases length of the dryer unit and greatly facilitates handling. A new type of screen reduces the overall height of the plant considerably, without reducing the bin capacity.

Further information concerning this plant will be furnished on request.

HETHERINGTON & BERNER Inc.
731 Kentucky Avenue • Indianapolis 7, Indiana

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OVER 25 YEARS A BUILDER OF BUCKETS

• This Erie 2-Line Clamshell has been selected by the U.S. Army and Navy to serve on all fighting fronts. They combine block and tackle plus leverage to achieve the greatest digging force available in a clamshell design whether reeved 2, 3 or 4 parts of line. Write for new bulletin.

ERIE STEEL CONSTRUCTION CO.
ERIE, PENNSYLVANIA
Aggre Meters • Buckets • Concrete Plants • Traveling Cranes

Jahn heavy-duty trailers are now equipped with hydraulic brakes.

Heavy-Duty Trailers Have Hydraulic Brakes

Announcement has been made by the C. R. Jahn Co., 1347 W. 37th Place, Chicago, Ill., that its heavy-duty industrial trailers, in capacities ranging from 5 to 100 tons, are now available with the same type of hydraulic brakes which have proved so efficient and safe on millions of trucks and passenger cars.

This new application of hydraulic brakes, which has been developed and thoroughly tested by Jahn engineers, means smoother faster braking action, with positive equal brake pressure on all wheels, the manufacturer states. There is no possibility of partial application or dragging of the brakes when operating over rough terrain, and full motive power can be utilized in pulling the load. It is also stated that unlimited oscillation of the tandem axles is possible without affecting brake action. The manufacturer also points out that, with brake rods, pins, and cables eliminated, maintenance is reduced to the minimum and safety is greatly increased.

Complete details on the Jahn line of heavy-duty trailers and this new feature of hydraulic brakes may be secured by interested contractors and highway engineers direct from the manufacturer.

Chicago Pneumatic Names New Jersey Distributor

Negotiations have been completed whereby the Smith Tractor & Equipment Co., Irvington, N. J., will represent the Chicago Pneumatic Tool Co., of New York City, maker of air compressors, rock drills, wagon drills, pneumatic and electric tools, in the New Jersey area. This appointment supplements the well known companies already represented by this distributor, which now include Caterpillar Tractor Co., Northwest Engineering Co., Wellman Engineering Co., Novo Engine Co., and Butler Bin Co.

A. A. Johnson Elected President of The Moles

Arthur A. Johnson, President of the Arthur A. Johnson Corp., and Chairman of the Post-War Public Works Committee of the General Contractors Association of New York, has been elected President of The Moles, New York organization of tunnel and heavy-construction men. Last February he received the 1944 Moles Award for "outstanding contributions to construction progress". For more than 35 years he has been engaged in building subways, tunnels, and other important engineering work in and around New York, including the preparation of the site for the New York World's Fair, and also the Bermuda Air Base and the Letterkenny Arsenal at Chambersburg, Pa. He recently completed his fifth term as president of the Chamber of Commerce of the Borough of Queens.

Other newly elected officers of The Moles are: Alfred N. Warwick, Eugene F. Warwick, Inc., First Vice President; Charles B. Spencer, Spencer, White & Prentis, Inc., Second Vice President; Edward J. Mahoney, Mahoney-Clarke Co., Sergeant-at-Arms; William W. Hanley, Jr., Koppers Co., Secretary; and Ralph W. Atwater, Shultz Dredging Co., Treasurer.

Trustees chosen include William V. McMenimen, Raymond Concrete Pile Co.; Hamilton O. Penn, H. O. Penn Machinery Co., Inc.; Carlton S. Proctor, Moran, Proctor, Freeman & Mueser; Robert K. Tomlin, *Construction Methods;* Frank W. Barnes, Merritt-Chapman & Scott Corp.; and Edmund A. Prentis, Spencer, White & Prentis, Inc.

New Quimby Sales Mgr.

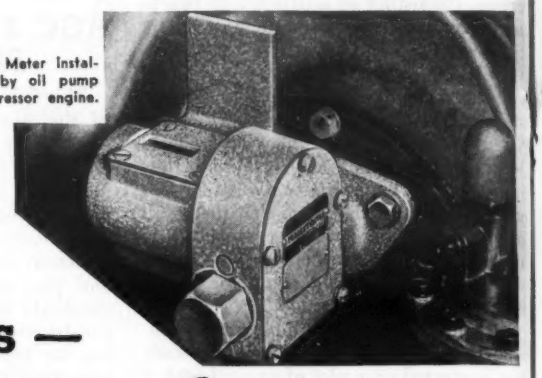
The appointment of Victor Failmezger, formerly application and field engineer for H. K. Porter Co., Inc., of Pittsburgh, Pa., to the position as Sales Manager of the Porter subsidiary, Quimby Pump Co. of Newark and New Brunswick, N. J., has been announced. Quimby manufactures centrifugal and sump pumps for use in the construction field as well as pumps for handling sewage.

Mr. Failmezger is a graduate of Stevens Institute of Technology and was associated with Westinghouse Electric & Mfg. Co., and Worthington Pump & Machinery Corp. in both sales and application engineering in the fifteen years prior to joining the Porter organization.

New Punch-Lok Catalog Of Clamps and Fittings

A new 8-page catalog describing and illustrating the Punch-Lok line of clamps and accessories for all types of hose and pipe has just been received. The variety of uses to which these fittings can be put are shown in illustrations, and tables of detailed information on all sizes are included. The catalog is standard 8½ x 11-inch size and punched for inclusion in a loose-leaf folder.

Copies of this catalog will be supplied upon request to The B. F. Goodrich Co., Industrial Products Div., Akron 18, Ohio, national distributor of the products. Just mention this item.



HM-7405 Hour Meter Installation driven by oil pump gear on compressor engine.

Hour Meters— Equipment Speedometers

Model HM-7429 For magneto equipped engines with SAE type A or B distributor mounting.

PRODUCTIMETERS THE SPEEDOMETERS OF INDUSTRY

register actual running hours of an engine... obtained thru the conversion of an average crankshaft speed into hours of running time. Indispensable... for securing service records such as oil and gas consumption, maintenance, repairs and replacements. Indispensable . . . for maintaining expensive equipment at highest efficiency; for estimating costs and basing rental charges.

Hour Meters are compact, accurate, easily adaptable to different types of engines. Complete details in

Catalog No. 20

DURANT MANUFACTURING COMPANY

1976 N. Buffum Street • Milwaukee 1, Wisconsin

IMMEDIATE DELIVERY...

on Mall VIBRATORS REG. U.S. PAT. OFF.

A Size and Type for EVERY Job

★ 1½ H.P. Gasoline Powered Unit.

★ 3 H.P. Gasoline Powered Unit with round base mounting.

★ 3 H.P. Gasoline Powered Unit with wheelbarrow mounting.

1½ H.P. Universal Electric Unit. Pneumatic Unit.

★ Interchangeable swivel fitted attachments for Vibrating Concrete, Wet Wall Rubbing, Wire Brushing, Grinding, Sanding, Drilling in Wood, Brick, Steel, Stone, and Sharpening Tools are available with gasoline-powered Vibrators.

MALL Concrete Vibrators are the most useful tools any contractor could own. They place a stiff mix concrete, eliminate honeycombs and voids, assure a better bond with reinforcement and a water-tight job. Be ready for V-DAY. Order your MALL Vibrator Now.

Ask your Distributer or write direct for literature and prices.

MALL TOOL COMPANY, 7743 South Chicago Ave., Chicago 19, Illinois

ARMY E NAVY

Mall REG. U.S. PAT. OFF. PORTABLE POWER TOOLS

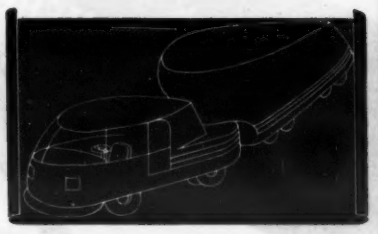
HOW P-T BOAT Clutch Experience WILL HELP THE Maneuverability of POST-WAR TRUCKS

The ingenuity that developed clutches capable of transmitting the sudden surges of power demanded of these compact "Masterpieces of precision" is available to designers of post-war motor vehicles. Let our power transmission engineers help you build war-tested performance into your new and improved models with—

ROCKFORD Spring Loaded CLUTCHES

Send for This Power Transmission Bulletin

It shows and describes how ROCKFORD power transmission engineers have made ROCKFORD CLUTCH and POWER TAKE-OFF applications that have lengthened the service life and improved the efficiency and economy of road machinery.



Contains diagrams, dimensions, capacities and specifications. Don't struggle with power transmission problems. Let our engineers help you beat competition by designing clutch applications that will give your product sales and production advantages.

ROCKFORD DRILLING MACHINE DIVISION BORG-WARNER CORPORATION

▼ 314 Catherine Street, Rockford, Illinois, U. S. A. ▼

Pullmore Multiple-Disc Clutches • Over-Center and Spring-Loaded Clutches • Power Take-Offs

C. & E. M. Photo

After spreading ⅜-inch crushed gravel on a 0.3-gallon application of tar, this Michigan road was dragged with a section of wire fencing.

New Tar Surfacing On Michigan Route

(*Continued from page* 48)

over too great a distance, and also it did not leave too great a length of center joint exposed to raveling by traffic.

Stone Aggregate

The stone cover coat used in this non-skid surface treatment is a washed and crushed gravel, 100 per cent of which passed a ⅜-inch screen, and from 0 to 15 per cent passed a No. 10 screen. The material was shipped in railroad gondola cars from the American Aggregate Co. in Green Oaks, Mich., 80 miles away. A site about midway on the job was selected for stockpiling and the stone was unloaded by a Northwest crane with a 1-yard clamshell bucket. The stone had to be unloaded at least a week before use so that any moisture could drain out, as not more than 2 per cent moisture was permitted in the stone. The stockpiles were covered with tarpaulins to keep out rain. Eleven rented trucks, mostly Fords and Chevrolets, were used to haul the stone from the stockpile to the spreader. These trucks, which held about 6 tons, were loaded by the Northwest crane, and were weighed to insure the proper rate of application. A Buckeye spreader was used in laying the stone at the rate of 30 pounds to the square yard.

Dragging and Rolling

Following the stone spreader was a truck dragging a 10 x 10-foot section of wire fencing with openings 1½ inches square which was pulled at an oblique angle over the applied cover stone. The truck moved slowly, from 5 to 10 miles per hour, pulling the fence section which was weighted with 2 x 4's to keep it on the road and insure a uniform distribution of the cover stone.

The surface was then rolled by a 5-ton 3-wheel roller. This comparatively lightweight roller was used so that the stone would not be crushed, which would prevent the formation of a non-skid surface. After the rolling, if any thin spots developed where the tar showed through the stone, they were covered by throwing on a little more stone with a hand shovel. This cover is one-stone or ⅜-inch thick.

Traffic was permitted immediately after rolling. Later the rotary broom was run along the shoulders to throw back on the pavement any loose stone which had been cast off by traffic. Normal traffic rolls and pounds this stone back into the tar.

Materials

For this contract 43,200 gallons of road tar No. T9 and 2,160 tons of cover stone were used to surface-treat 144,000 square yards of concrete pavement in a double lane 14 miles long. Averaging about 3 miles of full-width pavement a day, the contractor completed the job in one work week during the middle of September. A crew of nine men was employed as follows: two flagmen, two men for regulating the stone spreader, two shovelers for the stone spreader, one truck driver operating the pick-up truck and road drag, one man to fill in thin spots in the wake of the drag, and one roller man. The eleven rented trucks were hired with drivers.

Trencher Bulletin

An illustrated 8-page bulletin giving information on the Parsons Model 250 Trenchliner is available to those who are interested. This leaflet describes the mechanism of the machine as well as its uses on a variety of ditching jobs. Copies may be obtained by writing to the Parsons Co., Newton, Iowa.

Geerpres — THE WRINGER WITH THE AMAZING SERVICE RECORD

Reduces mop cost 25 to 50%!
Keeps mop fabric soft and fluffy!
Speeds mopping!
No loose mop strings to catch legs of desks and furniture!

Now with still further improved construction for even longer life. Two popular sizes: #1624 for 14 to 24 oz. mops; #2436 for 20 to 36 oz. mops.

Send for free catalog

GEERPRES WRINGER, INC.
Manufacturers of High Grade Mopping Equipment
P. O. Box 658 . . . . Muskegon, Michigan

Illustrated is Geerpres #2436T TWIN TANK UNIT

There's a Ready Market for Ready-Mix CONCRETE

Here's Why Johnson engineers Can Help You Plan Your Transit or Ready-Mix Plant for the Bigger Profits at Minimum Investment

How many people live in the area you plan to serve? What is your competition? How many yards of concrete will you sell per year? Is the plant on a railroad? How far from the aggregate supply? Will deliveries of materials be made by railroad or truck?

The answer to questions like these result in a plant layout drawn to the measure of your market, put you in business with Johnson equipment that delivers scientifically batched material as you need it . . . equipment that can be economically expanded as your market grows.

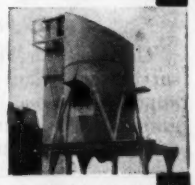
Remember Johnson Batchers have been specified on the largest concrete projects where equipment must deliver 24 hours a day, WITHOUT FAIL.

For experienced engineering service and proved equipment write us.

Johnson Step-by-Step Bin and Cement Silo

Central Mix-Plant Bin

Johnson Mixing Unit on Dam Project



Roadbuilders Dutch-mill with Screw-feeder

the C. S. JOHNSON COMPANY
Champaign • Illinois

TRANSLODE Expansion and Contraction Joints have been giving excellent load transfer performance on thousands of miles of American pavements since 1932. Today's improved and simplified design retains the continuous base which makes installation easier and seals the joint against the infiltration of dirt from the soft subgrade. The weight of the joint has been reduced while the rigidity has been increased to make handling and finishing easier.

SINGLE ANGLE UNIT

CONTRACTION JOINT

EXPANSION JOINT

HIGHWAY STEEL PRODUCTS COMPANY

CHICAGO HEIGHTS, ILL.

Help hasten the day of victory, and help make that victory more secure —buy your War Bonds today.

Virginia Progresses In Highway Planning

(*Continued from page 67*)

of belt-line distribution roads around or through towns and cities, at an estimated cost of $44,000,000; and 174 miles of divided highways at an estimated cost of $55,000,000.

Engineer Shortage

The loss of technical trained personnel to the armed forces and to war industries has been the most serious handicap to all highway departments in preparing post-war plans. As stated previously, Virginia has lost 10,000 people in the past two years.

In the Department of Location and Design, which controls all survey parties, designers, draftsmen, etc., the turnover in personnel in the past two years has been 500 per cent. This means that new personnel is constantly being trained and, while 40 per cent of the normal number of employees is kept on the payroll, the percentage in volume of production is necessarily much lower.

No stone is left unturned to uncover employees capable of assisting in our post-war program. All colleges and high schools have been contacted for boys 16 years of age or over to serve on survey parties. We had approximately 50 college and high school girls in the drafting rooms last summer.

Beginners' work in our drafting department is being taught at one of the large high schools in Richmond from plans and materials furnished by the Department of Highways. From this class on June 10 we secured 20 pupils capable of making some contribution to our effort.

The drafting forces have already been supplemented by 15 to 20 girls who were graduated from colleges last year. They have now passed their training period and are turning out very creditable work. Application has been made to the Veterans Placement Bureau for discharged servicemen and a constant watch is kept for 4F's with engineering ability.

Funds for Planning

The question of funds available for surveys and plans does not, at present, appear to be one of our problems. Virginia has been granted $184,418 in Federal funds to be matched by the State, making a total of $368,836 for surveys and plans on belt-line distribution roads, and the Highway Commission has not limited the funds to be spent in the preparation of plans for other worthwhile projects.

Under normal conditions the Right-of-Way Engineer is given an annual allocation of $1,000,000. This is supplemented as additional funds are needed. Owing to the suspension of construction, these funds are being used to acquire rights-of-way for post-war projects wherever necessary. In a great many cases options can be taken pending definite construction.

With revenues so materially reduced owing to restrictions on gasoline, tires, and mileage allowed, it has been impossible to build up any large reserve for post-war construction. At present Virginia has a reserve of $17,000,000 with the prospect of using some of these funds, depending on the length of the war, for protective maintenance.

Status of Plans

With our depleted forces, plans for 318 miles of new construction will be ready by January 1, 1945. In 1945 we should produce plans for $15,000,000 during each six-month period. For the completed plans approximately 40 per cent of the right-of-way has been secured.

The Highway Commissioner of Virginia has approved a program well balanced and properly distributed geographically which will offer employment limited only by the volume of plans that can be prepared.

Virginia, extending from the Atlantic Ocean through the Appalachian Mountains, with worthwhile projects in every section of the state, including large bridges in both the tidewater and mountainous sections, will require a diversity of materials and a personnel trained in many occupations.

New Catalog for Welders

The new 1945 Twecolog, a 12-page catalog, describes completely the line of cable connections for electric welding which is manufactured by Tweco Products Co., Wichita 7, Kans. Items shown in the catalog include electrode holders, both plain and insulated, ground clamps, cable connectors, machine terminals, and cable lugs. Copies of this catalog are available to those writing direct to the manufacturer and mentioning CONTRACTORS AND ENGINEERS MONTHLY.

New FWA Regional Director

Laurence A. Gillett has been appointed Regional Director for Federal Works Agency Region 1, comprising the New England States, New York, New Jersey and Pennsylvania, with offices at 101 Park Ave., New York City. Previous to this appointment, Mr. Gillett was located in Chicago, serving as FWA Regional Director for the area including six midwestern states.

LINN CATRUK AND SEMI-TRAILER

THIS LINN CATRUK, as a prime mover, is equipped with rotable crane, seating capacity for a crew of 14, large tool compartments and, in combination with a quickly detachable **LINN SEMI-TRAILER,** has a definite use as a cargo, salvage, construction or emergency vehicle.

Equipped with both tracks and wheels (the hydraulic retraction makes the change from wheels to tracks in a matter of seconds) permits the negotiation of highway or cross country with equal facility.

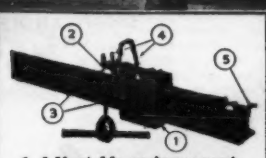
THE LINN MANUFACTURING CORP. Morris, N. Y.

NEW MASTER VIBRATORY SCREED

Places up to 6,000 sq. ft. of concrete per hour!

THIS new vibratory finishing screed makes possible accurate strike-off and compaction of concrete slabs in one easy operation. *No additional vibration or floating is required.* Saves time and manpower in placing floors, aprons, runways, roads and service areas. Models: VS-8 ft.; VS-10 ft.; VS-13 ft.; VS-16 ft.; VS-20 ft.; and VS-25 ft.; all models adjustable for length. Wider widths or special shape vibratory screeds to your requirements. All vibratory screeds powered by economical 1½ HP variable-speed gas engines including Master Automatic Clutch.

Write for Bulletin 596 for complete details.



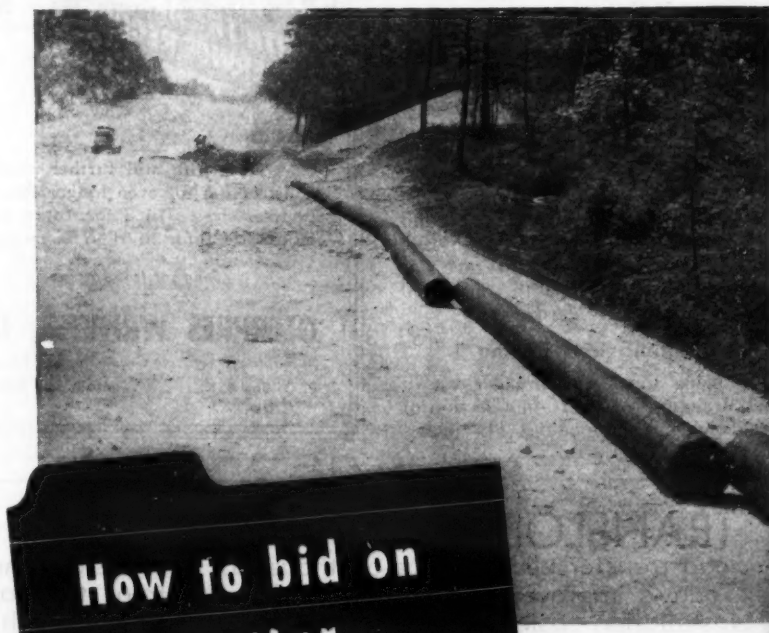
1. Adjustable spring mounted shoes
2. Two way draw
3. Easy adjustment for length
4. Yoke for lifting
5. Remote engine control

MASTER VIBRATOR COMPANY

Dayton 1, Ohio • Distributors throughout United States and Canada

Products Include: Concrete Vibrators, Gas or Electric Surfacing Attachments, High Speed Tools • Vibratory Concrete Finishing Screeds • Rotary Concrete Floor Finishing Machines • Portable Gas Electric Generator Plants 500 Watt to 7000 Watt Voltage Regulators and Portable Mountings Optional • Master Hand and Shoulder Drills • Electric and Gas Engine Driven Power Blow Hammers

How to bid on Post-War Subdrains



Installing 18,000 ft. of 8-in. ARMCO Hel-Cor Perforated Pipe on the new Philadelphia road in Cecil County, Maryland.

★ ★ ★

New highways after the war will be built differently. If road builders profit by the experience of highway break-ups and airport runway troubles, the new roads will be built on dry, stable foundations.

That means adequate subdrains and more work for the contractor. Farm drainage methods and blind drains will not do. Modern roads will require designed subdrains consisting of: (1) a trench deep enough to intercept all the water before it reaches the roadway, (2) a graded backfill that will keep out silt, (3) a perforated corrugated metal pipe that resists impact, vibration and disjointing, and (4) an adequate outlet.

Because of the light weight long lengths, few joints, and absence of breakage of ARMCO Perforated Pipe, you can install it quicker and easier and at less cost per foot. You will like to handle this pipe, too, and your job will move along more smoothly. Ask for literature on designed subdrainage. Address: Armco Drainage Products Association, 175 Curtis Street, Middletown, Ohio.

ARMCO Perforated Pipe

New Concrete Apron At Texas Army Base

(*Continued from page 60*)

Mix, Place, Finish, and Cure

A single dumper handled the incoming trucks at the skip of the Koehring 34-E double-drum paver which operated outside the lane being poured. Water for the concrete mixing was obtained from the Post's distribution system and hauled in 1,000-gallon tank trucks carrying small gasoline-driven centrifugal pumps for transferring the water to a trailer-mounted 1,000-gallon tank, pulled by the paver, from which water for mixing was secured.

Alternate lanes, ten of them 22 feet wide and two 15 feet wide, were poured, each for the full length of the apron. The job was so organized that a complete lane was poured in daylight hours, with the moving of equipment to the next lane, to be paved in the opposite direction the next day, done by sleds after paving operations were suspended. The excellent strength tests obtained, averaging 590 pounds in 7 days and 800 in 28 days, permitted early use of the paved lanes for hauling and the operation of the finishing machines, in some instances within 72 hours.

The concrete, which had a slump of 2½ inches, was handled by four puddlers who also spaded the edges. Initial finishing was done by a Jaeger-Lakewood finishing machine with two screeds, followed by a Flex-Plane machine from which two men assisted the operator in setting the 2-inch center-strip ribbon and cutting the 2-inch-deep grooves at 15-foot intervals for the transverse dummy joints. Then came a Koehring Longitudinal Finisher, followed by two hand finishers with checking straight-edges. Pulling of dummy-joint strips and the finishing of both expansion and contraction joints, as well as edge finishing, belting and hosing, were done by six additional finishers using a rolling bridge from which to work over the freshly laid concrete.

Hunt Process curing compound was sprayed onto the finished pavement by two men working from a rolling bridge which carried the pump and a drum of curing compound.

The morning after the pavement had been placed, a crew of six men cleaned and poured the joints. OA-135 asphalt, heated in a Littleford 150-gallon gasoline-fired kettle, was poured through bottom-valve cone-shape pouring pots.

Major Quantities and Personnel

The contract for additional runways and tie-down apron at the Matagorda Island Bombing and Gunnery Range in Texas was awarded to Brown & Root, Houston, Texas, by the Galveston District Office, U. S. Engineers, on February 12, 1944, on their low bid of $986,102, and included the following items:

Excavation	195,000 cu. yds.
Top soil	220 acres
Flexible base, 6-inch compacted thickness	248,300 cu. yds.
Prime coat	85,000 gals.
Asphaltic concrete, 2-inch	229,200 sq. yds.
Concrete pavement, 9-6-9	50,777 sq. yds.

James M. Dellinger, Vice President, was in charge for Brown & Root. The work was under the direction of the District Engineer, U. S. Engineer Office, Galveston, Texas, with Captain W. J. Lynch, Resident Engineer, assisted by Lloyd Campbell and Thomas N. Cosgrove.

Roadside Development Papers Are Published

The reports and special papers presented by the Committee on Roadside Development at the Twenty-Third Annual Meeting of the Highway Research Board in Chicago, Ill., November 27-30, 1943, have been published in a 108-page volume with an appendix containing the specifications of the Corps of Engineers on grass seed, topsoiling, topsoil planting, seeding, sodding, sprigging, and mulching.

This volume contains an unusual group of reports on construction and maintenance covering erosion control, principles of highway drainage, turf for airfields and roadside development, and a report on an inspection and evaluation of cooperative highway erosion-control demonstration projects.

Copies of this volume of reports and papers may be secured for $1.00 each from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

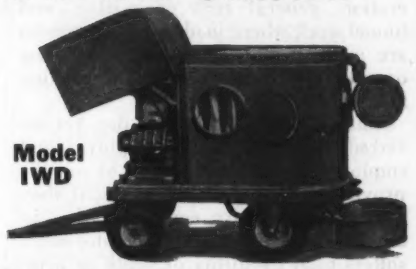
New Northwest Dealer

A. M. Flanders, Inc., 410 N. Main St., Barre, Vt., has been appointed to represent the Northwest Engineering Co., of Chicago, Ill., maker of excavating and earth-moving equipment, in that territory.

What YOU SHOULD KNOW ABOUT

MARKLEY-CARTER Portable DUST COLLECTORS "Collects and Controls"

1 Portable units operate through powerful air stream by an effective double separation principle. No dust escapes into the air. Reduces SILICOSIS hazard to safe hygienic limit.
2 When applied to rock drills, SPEEDS UP DRILLING TO 33 PERCENT. Drill steel cuts into fresh rock unimpeded by dust or chips. PROLONGS LIFE OF DRILL STEEL. REDUCES SHARPENING COSTS.
3 Quick detachable hood permits easy inspection of hole and changing drill steel without interference from hood.
4 When applied as industrial unit, collects dust accumulations that are costly and apt to be a hazard both to men and equipment. Keeps your plant, motors and machinery free from harmful dusts.
5 Equipped with Markley-Carter disposal container which permits continuous collection and disposal without closing down the system.



● *Write for Bulletin 4402 which describes in detail the advantages of using* MARKLEY-CARTER DUST COLLECTOR *in your quarry and plant.*

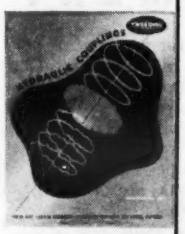
RALPH B. CARTER COMPANY
192 ATLANTIC ST., HACKENSACK, N. J. 53 PARK PL., N. Y. 7, N. Y.

WEIGHS 30% LESS

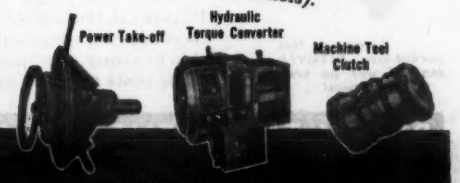
Twin Disc Hydraulic Couplings are fabricated from sheet steel formed and welded into solid units. This type of construction not only weighs, on the average, 30% less than the cast iron type, but also gives you these added advantages:

1. *A more responsive coupling*—easier to get in motion—easier to stop because there is less inertia—less "flywheel effect."
2. *Minimum axial length*—this means a more compact unit.
3. *Increased capacity* and efficiency because more blades can be used in the same space.
4. *Less skin friction* of the fluid within the unit because of the comparative surface smoothness of sheet steel as against unmachined castings.
5. Can be *operated at higher speeds*, thus increasing the h.p. capacity for a given size.

A NEW BULLETIN for engineers, designers and builders of industrial machinery is now ready for distribution. Write for your copy of Bulletin No. 136.



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



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TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

STERLINGS SPAN THE STATES!
If the millions of wheelbarrows produced by the Sterling Wheelbarrow Company were placed end to end, they would span the United States, coast to coast. Today, many of these sturdy Sterlings are in the service of Uncle Sam, wheeling vitally needed war materials . . . doing their part to help speed VICTORY.
STERLING WHEELBARROW CO., MILWAUKEE, WIS.
Look for this Mark of STERLING Quality
Sterling
WHEELBARROWS

N. J. Silicosis Act Effective in January

An Act approved April 10, 1944, by the New Jersey State Legislature provides an elective system of compensation for silicosis and asbestosis, the former of which is applicable to the construction industry, particularly in quarry operation, general rock excavation, and tunnel work where inadequate provisions are made to collect dust from drilling operations and thus prevent its reaching the lungs of workmen.

Chapter 88, P. L. 1944, the Act referred to, provides that employer and employee may elect to accept or not the provisions of the Act. However, if they are accepted, every employee who, in the regular course of his employment, suffers total disability or death as a result of silicosis or asbestosis, is entitled to workmen's compensation as provided by the Act. Disability is defined as "the state of an employee's being actually incapacitated, because of silicosis or asbestosis, from performing his work in the last occupation in which he was injuriously exposed to the hazards of such disease".

Copies of this Act, which will take effect January 1, 1945, may be secured by writing to the New Jersey Department of Labor at Trenton.

Heil Names Sales Manager

William E. Simons has been appointed Sales Manager of the Body & Hoist Division of The Heil Co., Milwaukee, Wis., maker of motor-truck bodies, bulldozers, and similar highway equipment. Mr. Simons joined the organization in October, 1943, and since that time has been in charge of the Materials Division. Previously he had served as a branch manager of the Ford Motor Co. over a period of twenty-six years.

Another staff advancement is the appointment of Earl C. Gilmore, formerly Body & Hoist Sales Manager, as Assistant Treasurer of The Heil Co.

CUMMER
ASPHALT PLANTS
EIGHT SIZES
Up to 1000 Tons per day
DRYERS
Two-Fire and Internal Fire
30 to 100 Tons per hour
Electric Batch Timers
50 Years' Experience
THE F. D. CUMMER & SON CO.
EAST 17th & EUCLID
CLEVELAND 15, OHIO

MAINTENANCE WITH BITUVIA Road Tar

PROTECTS YOUR HIGHWAY INVESTMENT

A copy of this pocket-size BITUVIA Manual will be sent on request

● Neglected roads, long overdue for repairs, must receive attention during 1945 if highway investments are to be protected and essential traffic kept moving at the speed demanded by war.

BITUVIA Road Tar is particularly adapted for wartime maintenance work because it requires a minimum of equipment and man hours per mile. Other outstanding advantages of BITUVIA are its deep penetrating and firm binding qualities.

A Reilly engineer will be glad to show you how BITUVIA can be used—quickly and economically—on practically all types of maintenance and repair work.

PLASTUVIA CRACK FILLER

PLASTUVIA binds firmly with concrete and brick, and thoroughly waterproofs cracks. Does not break or chip in winter, nor "pick" in summer. Reduces crack filling costs to a new minimum.

REILLY TAR & CHEMICAL CORPORATION
Executive Offices: Merchants Bank Building, Indianapolis, Indiana
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SEVENTEEN PLANTS TO SERVE YOU

Directory of EQUIPMENT DISTRIBUTORS

The following cards (arranged by states) show the names of dealers in contractors' equipment and supplies, with a list of the names of the principal manufacturers whom they represent.

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2416 E. 16th St. Los Angeles, Calif.

Southern California Distributors for

BROWNING—Truck Cranes, Shovels, Locomotive Cranes
DIAMOND IRON WORKS—Crushers, Portable Gravel Plants
DAVEY—Compressors
LAMBERT-NATIONAL—Hoists and Cableways
McKIERNAN-TERRY CORP.—Pile Hammers
A. LESCHEN & SONS—Wire Rope
NOVO—Engines, Pumps, etc.
OMAHA—Dragline Buckets
OWEN—Clamshell Buckets
RANSOME—Concrete Mixers, Pavers, etc.
WOOD—Road Mixers

Manufacturers of

GAR-BRO—Concrete Carts, Wheelbarrows, Concrete Hoppers, Buckets, wire rope fittings, etc.

Member: Associated Equipment Distributors

EDWARD R. BACON CO.

Folsom at 17th St. San Francisco

Aeroil Burner Co.
Austin-Western Co.
Alloy St. & Metal Co.
Amer. Hoist & Der. Co.
Byers Mach. Co.
Champion Bl. & Forge Co.
Cleveland Trencher Co.
Concrete Surf. Machy. Co.
Dobbie Fdry. & Mach. Co.
Dreyer Wh. Co.
Edwards Mfg. Co.
Elec. Tamper & Eq. Co.
Everhot Mfg. Co.
Gar-Bro Equip.
Handlan, Inc.
Hercules Motors Corp.
Frank G. Hough Co.
Indep. Pneu. Tool Co.
Jaeger Mach. Co.
Johnson Co., C. S.
Jones Sup. Mach. Co.
Kiesler Co., Jos. F.
Klauer Mfg. Co.
Kohler Co.
Linde Air Prods. Co.
McKiernan-Terry Corp.
Mallory Logging Eq. Co.
Marion Steam Shovel Co.
Nelson Iron Works, N. F.
Nordberg Mfg. Co.
Ohio Loco. Crane Co.
Portable Machy. Co.
Page Eng. Co.
Roebling's Sons, Co.
Sacramento Eng. & Mach. Wks.
Sasgen Derrick Co.
Rogers Bros. Corp.
Roper Corp., G. K.
Round Calif. Chain Corp.
Schramm, Inc.
Symmons Bros. Screen Co.
Solano Iron Wks.
Sandstorm Mfg. Co.
Templeton-Kenly & Co.
Toledo Pressed St. Co.
Univ. Form Clamp Co.
Waterloo Const. Co.
Whiteman Mfg. Co.
Winslow Gov't Standard Scale Wks.

NORRIS K. DAVIS

400 Seventh St. San Francisco, Calif.

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DAVIS COMPANY—Large Tilting Mixers, 1, 2, 3, and 4-yd., Weigh Batchers, Batching Plants, Manual or Full Automatic Operation, Readymix Concrete Plants and Equipment, Motor Truck Concrete Mixers and Carriers, Electrically Operated and Controlled Water Meters, Bins, Hoppers, etc.
W. E. GRACE MFG. CO.—Road Sweepers.
HANSON CLUTCH & MACHY. CO.—Full Revolving Shovels, Cranes, Draglines, ⅜, ½, ⅝, and ¾-yd.
LE ROI CO.—Gasoline Power Units and Parts
MINN. STL. & MACHY. CO.—Twin City Engines, parts
NORTHERN CONVEYOR CO.—Stationary & Portable Conveyor Units
O. K. CLUTCH & MACHY. CO.—Hoists & Compressors
EARL WALKER CO. INC.—Road Oollers, Walker Bars
SNOW REMOVAL EQUIP. CO.—Rotoblade & Sierra Snow Plows

Member: Associated Equipment Distributors

HARRON, RICKARD & McCONE COMPANY

2070 Bryant St., San Francisco 10
3850 Santa Fe Ave., Los Angeles 11

Representing

*Broderick & Bascom—Wire Rope
Esco—Dippers, Dragline Buckets, etc.
Essick—Plaster Mixers, Rollers, Hoists
Gorman-Rupp—Pumps
Insley—Excavators
**C. S. Johnson—Bins and Batchers
Koehring—Shovels, Mixers, Pavers, Dumptors
Kwik-Mix—Mixers
*Littleford — Bituminous Equipment
Mall—Vibrators
National Lead—Cinch Anchor Specialties
Parsons—Trenchers
Paxson—Bearcat Saw Tables
Pioneer—Gravel Equipment
Sterling—Wheelbarrows
Vulcan—Pile Driving Equipment

*Not handled in Los Angeles territory.
**Los Angeles territory only

Member: Associated Equipment Distributors

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Buckeye Traction Ditcher Co.
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Buffalo-Springfield Roller Co.
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Cleaver-Brooks Co.
Construction Machinery Co.
International Harvester Co.
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Everything in construction equipment.

Member: Associated Equipment Distributors

FLORIDA-GEORGIA TRACTOR CO.

Jacksonville—Lakeland—Miami

American Cable Div., American Chain & Cable Co.
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Bucyrus-Erie Co. Tractor Equipment
Buda Co.
Chain Belt Co.
Cleaver-Brooks Co.
Cleveland Formgrader Co.
Electric Tamper & Eq. Co.
Euclid Rd. Machy. Co.
Four Wheel Drive Auto Co.
Gallion Allsteel Body Co.
Hesco Mfg. Co.
Gallon Iron Wks. & Mfg. Co.
Heltzel St. Form & Iron Co.
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Ingersoll-Rand Co.
Ingram Equipment Co., J.E.
Int'l Harvester Co.
Iowa Mfg. Co.
Jones Superior Mach. Co.
Kensington Steel Co.
Marlow Pumps
Murphy-Diesel Co.
Northwest Engrg. Co.
Owen Bucket Co.
Page Engrg. Co.
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Member: Associated Equipment Distributors

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Berkeley Pumps Co.
Browning Mfg. Co., Inc.
Century Electric Co.
Climax Engrg. Co.
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Crocker-Wheeler Elec. Mfg. Co.
Henry Disston & Sons, Inc.
Dodge Mfg. Corp.
Farm & Home Machy. Co.
Goulds Pumps, Inc.
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Independent Pneu. Tool Co.
Ingersoll-Rand Co.
Jaeger Machine Co.
Edw. E. Johnson, Inc.
LeRoi Co.
Link-Belt Co.
Littleford Bros.
Marshalltown Mfg. Co.
Morse Chain Co.
F. E. Myers & Bros. Co.
Northwest Engrg. Co.
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Nove Engine Co.
Ohio Pattern Wks. & Fdy. Co.
Owen Bucket Co.
Page Engrg. Co.
Permutit Co.
Roberts Filter Mfg. Co.
Sasgen Derrick Co.
A. P. Smith Mfg. Co.
Square D Co.
Stearns Mfg. Co.
Stover Mfg. & Engine Co.
Viking Pump Co.
Wall Rope Works, Inc.
Whitehead Bros. Rubber Co.
Wickwire Spencer St. Corp.
Wisconsin Motor Co.
Yale & Towne Mfg. Co.
Yates-American Machine Co.

P. A. NEFF

1920 N. W. Miami Court, Miami, Fla.

Sales—Service—Rentals

Atlas Conveyor Co.—Belt Conveyers
Butler Bin Co.—Bins, Batchers, Scales, Car Unloaders
Chain Belt Co.—Mixers, Pumps, Pavers
De Walt Products Corp.—Wood Working Machines
Independent Pneumatic Tool Co.—Air Tools, Electric Drills, Hammers; Hand Saws
Lansing Co.—Wheelbarrows, Concrete Carts
Le Roi Co.—Air Compressors
Lima Locomotive Wks., Inc.—Shovels, Cranes
Mall Tool Co.—Vibrators, Saws, Terrazzo Machines
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Wellman Engrg. Co.—"Williams" Buckets

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Member: Associated Equipment Distributors

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Atlanta, Ga.

American Cable Wire Rope
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Barber-Greene Ditchers, Conveyors, Asphalt Equipment
Barnes Pumps
Buffalo-Springfield Rollers
"Caterpillar" Tractors, Graders, Power Units, etc.
Butler Bins, Batchers, Cement Pl.
Cedar Rapids Crushers
Clyde Hoists
Connery Asph. Kettles, Tools
Federal Trucks
Durex Saw Rigs
Grace Sweepers, Tank Car Heaters, Blowers
Ingersoll-Rand Air Compressors, Air Tools
Jackson Concrete Vibrators
Killefer Rippers, Harrows, Cultivators
Kinney Asphalt Distributors
LaPlant-Choate Bulldozers, Trailbuilders, Tamping Rollers, Scrapers
Metaform Road, Sidewalk, Curb & Gutter Forms
Page Dragline Buckets
Red Edge Shovels
Red Star Wheelbarrows, Concrete Carts
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Thew-Lorain Shovels, etc.
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"Williams" Buckets

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3401 South Hoyne Ave., Chicago, Ill.

Telephone: Virginia 1100

BATES Wire Ties, etc.
BYERS Crawler Cranes, Shovels, Draglines
BEEBE BROS. Hoists
CHAIN BELT Mixers, Pavers, Pumps, Elevators, Pumpcrete, Moto Mixers
ERIE Steel Bins, Batchers, Aggremeter Plants
M & M Form Clamps
MEYER-HECHT Adjustable Shores
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SCHRAMM Air Compressors, Tools
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Wheelbarrows, Hose, Cable Rope, Tarpaulins, Vibrators, etc., carried in stock

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13912 S. Halsted St., Chicago 27, Ill.

Phone: Riverdale 1300

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Asroil—Tar Kettles
Barnes—Centrifugal Pumps
Byers—Shovels, Cranes
Centaur—Hi-Way Mowers
C. H. & E.—Saw Rigs, Hoists, Pumps
Cleveland—Rock Drills, Paving Breakers, Air Tools
Galion—Rd. Machy., Graders, Motor Patrols, Rollers, Sand, Chip Spreaders, Sheepsfoot Rollers
Kohler—Generators, Lighting Plants
Le Roi—Air Compressors
LeTourneau—Heavy Earthmoving Equip.
Leschen—Hercules Red Strand Wire Rope
Michigan Power Shovel—Truck Cranes, Truck Shovels
Syntron—Conc. Vibrators, Generators
Williams—Buckets

Clamshell and Dragline Buckets, Belting, Rubber Hose, Road Torches, Wheelbarrows, Scoops, Spades, Shovels, Tools, Supplies

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GENERAL CONSTRUCTION EQUIPMENT CORP.

5040 So. Halsted St., Chicago, Ill.

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Construction Machinery Co.—Concrete, Mortar, Bituminous Mixers; Pumps, Saws, Bins & Batchers, Wheelbarrows, Carts, Hoists
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Everhot Mfg. Co.
R. G. Haskins Co.
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Barber-Greene Loaders, Bit. equip.
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LeTourneau Earth Moving Equipment
Littleford Kettles, Distributors, Rollers, Brooms
Int'l Harvester Indus. & wheel tractors
Nat'l Wire Cloth Screen Cloth
Owen Clamshell Buckets
Page Dragline Buckets
Roebling Wire Rope
Sauerman Scrapers
Sterling Hoists, Generators
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CLYDE—Gasoline and Steam Hoists, Derricks
LITTLEFORD—Heaters, Kettles, Bituminous Distributors
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SULLIVAN—Air Compressors, Tools
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Cletrac—Tractors
Gallon—Motor Graders, Rollers, Blade Graders
General — Wheelbarrows, Grader Blades
W. R. Grace—Sweepers, Road Brooms
Heil—Bulldozers, Scrapers
Heltzel—Road Forms, Bins, Batchers
Hendrix—Dragline Buckets
Hercules Motors — Natural Gas, Diesel, Gasoline Engines
Littleford—Asphalt Kettles, Distributors
Mall Tool—Vibrators
Murphy Diesel—Engines
Northwest—Shovels, Cranes, Draglines, Pullshovels
Page—Dragline Buckets
Skilsaw—Electric Handsaws, Drills
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AMERICAN CABLE—Truflay Wire Rope
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CLEVELAND—Paving Breakers, Sinker Drills
GALION—Leaning - Wheel Graders
GENERAL—Wheelbarrows
GOOD ROADS—Crushers, Snow Plows
JAEGER—Concrete Mixers, Pumps, Truck Mixers, etc.
JONES—Saw Rigs
LAKEWOOD—Finishers, Forms, Towers
LITTLEFORD—Asphalt Heater, Distributors
MALL—Conc. Vibrators
NELSON—Loaders
TIMKEN—Detachable Rock Bits
WHEELING—Corrugated Culvert Pipe

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Baker—Scrapers, Bulldozers, Trailbuilders, Snow Plows
Buckeye—Finegraders, Spreaders, Ditchers, Backfillers, Shovels, Cranes
C. H. & E.—Saw Rigs
Chain Belt—(Rex) Mixers, Pavers, Pumps, Pumpcrete
Chicago Pneumatic—Compressors, Drills, Breakers, Pneumatic and Electric Tools
Cleveland—Formgrader, Form Tampers
Euclid—Wagons, Bulldozers
Gar Wood—Scrapers, Bulldozers, Trailbuilders
Grace—Road Sweepers
Haiss—Loaders, Conveyors, Buckets
Hough—Shovels
Iowa—Quarry Sand & Gravel Equipment, Black Top Plants
Jones & Laughlin—Gilmore Wire Rope
Northwest—Shovels, Cranes, Draglines
Page—Dragline Buckets
Wiley—Whirleys, Steel Barges, Conc. Buckets, etc.

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Ingersoll-Rand Co.
Jackson Mfg. Co.
Johns-Manville
A. Leschen & Sons Rope Co.
Lidgerwood Mfg. Co.
Lima Locomotive Works
Master Vibrator Co.
Novo Engine Co.
Richmond Screw Anchor Co.
Shaw Bx. Cr. & Hoist Div.
Sterling Wheelbarrow Co.
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Union Iron Works, Inc.
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Member: Associated Equipment Distributors

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BAKER—Bulldozers
BEEBE BROS.—Hoists
BUCYRUS-ERIE—Cranes, Shovels, Draglines
BURCH—Ross Plows, Road Machinery
CLEVELAND—Form Graders
EUCLID—Earthmovers
C. R. JAHN CO.—Trailers
GARDNER-DENVER—Air Compressors
GENERAL MOTORS—Diesel Engines
HAISS—Elevators, Conveyors and Loaders
HAUCK—Oil Burners and Heaters
HAZARD—Wire Rope, Cable
HELTZEL—Bins and Forms
HOMESTEAD—Hypressure Jenny Cleaner
MARLOW—Self-Priming Pumps
MASTER—Vibrators
PIERCE—Rollers
RANSOME—Concrete Mixers, Chuting Equip.
GAR WOOD—Scrapers, Sheepsfoot Rollers

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Byers Machine Co.
Con. Surfacing Machy. Co.
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Keobring Mixers, Pavers, Shovels, Dumptors
Kwik-Mix Concrete and Bituminous Mixers
Littleford Distributors, Tar Kettles, Heaters
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Contractors and Engineers Monthly

C. & E. M. Photo

Farmers, glad to be rid of it, hauled in field stone to this Universal portable crushing and screening plant set up by H. E. Sargent, contractor, at a gravel pit near Houlton, Maine, to furnish crushed stone for the 8-inch foundation for a bituminous-macadam access road to Houlton Airport. See page 7.

Winter scenes on Connecticut state highways. Top photo, a Ross V-plow on an Autocar truck pushes plowed snow as far off the road and shoulder as possible, to provide room for later accumulations of snow. Lower photo, a wing plow in action. See page 12.

U. S. Engineers Photo

A general view of channel-stabilizer construction in the Los Angeles River in California. At left, vibrating the 3-foot concrete coat which covers the derrick-stone core wall of one of the twelve stabilizers built by the Guy F. Atkinson Co. for the Los Angeles District Office of the U. S. Engineers. See page 33.

Don't Stop
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Bonds

At right, surface-treating a county road with tar and pea gravel in Oakland County, Mich. See page 9.

At left, muck conditions at the site of boiler-room excavation for an addition to the West Penn Power Co. generating station at Springdale, Pa., showing the mats for the shovel and the wellpoint header pipe at ground elevation. Above, after the Griffin wellpoint system went to work, the shovel excavating in the dry about 19 feet below ground level. See page 1.

V-plow on
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